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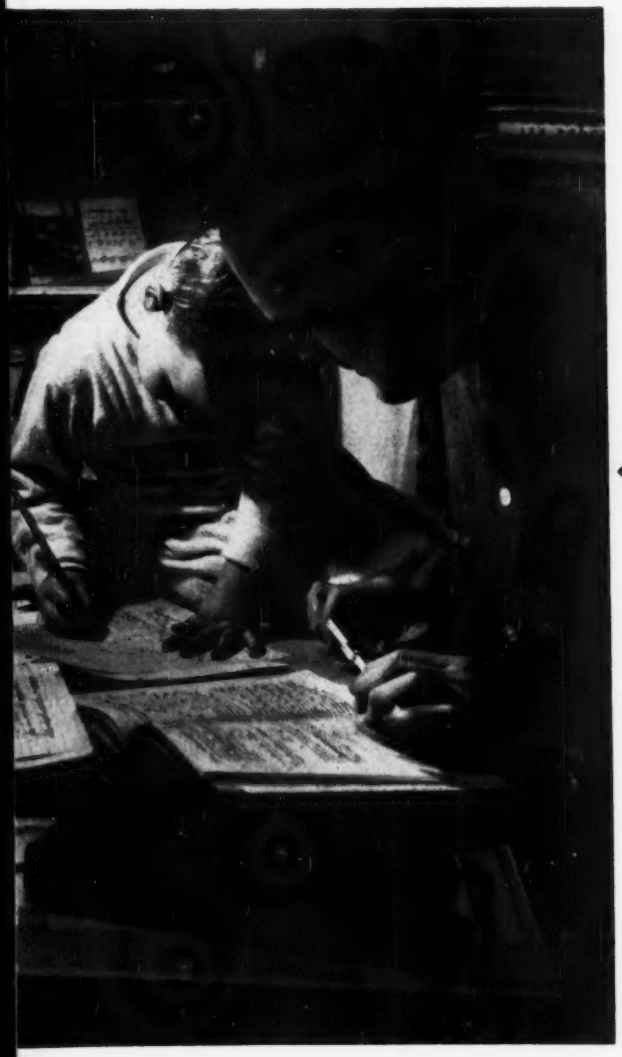
Chemical Week



CPI's guide to Europe. Where and how to cash in on profit opportunities . . . . . p. 21

Contract cleaning is big market for specialties—but a hard one to sell . . . . . p. 33

Monsanto man at work. Firm pays for his full-time systems-engineering studies . . p. 73

Rayon flexes new muscles, as research tightens fiber's grip on markets . . . . . p. 106

Automated payroll plan—fast new accounting system pays off for Allied divisions . p. 119

March 21, 1959

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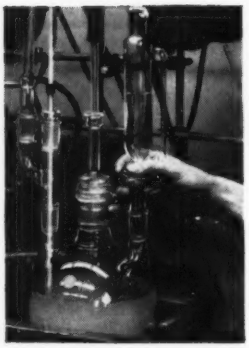

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- ☐ See attached letter on my problem.

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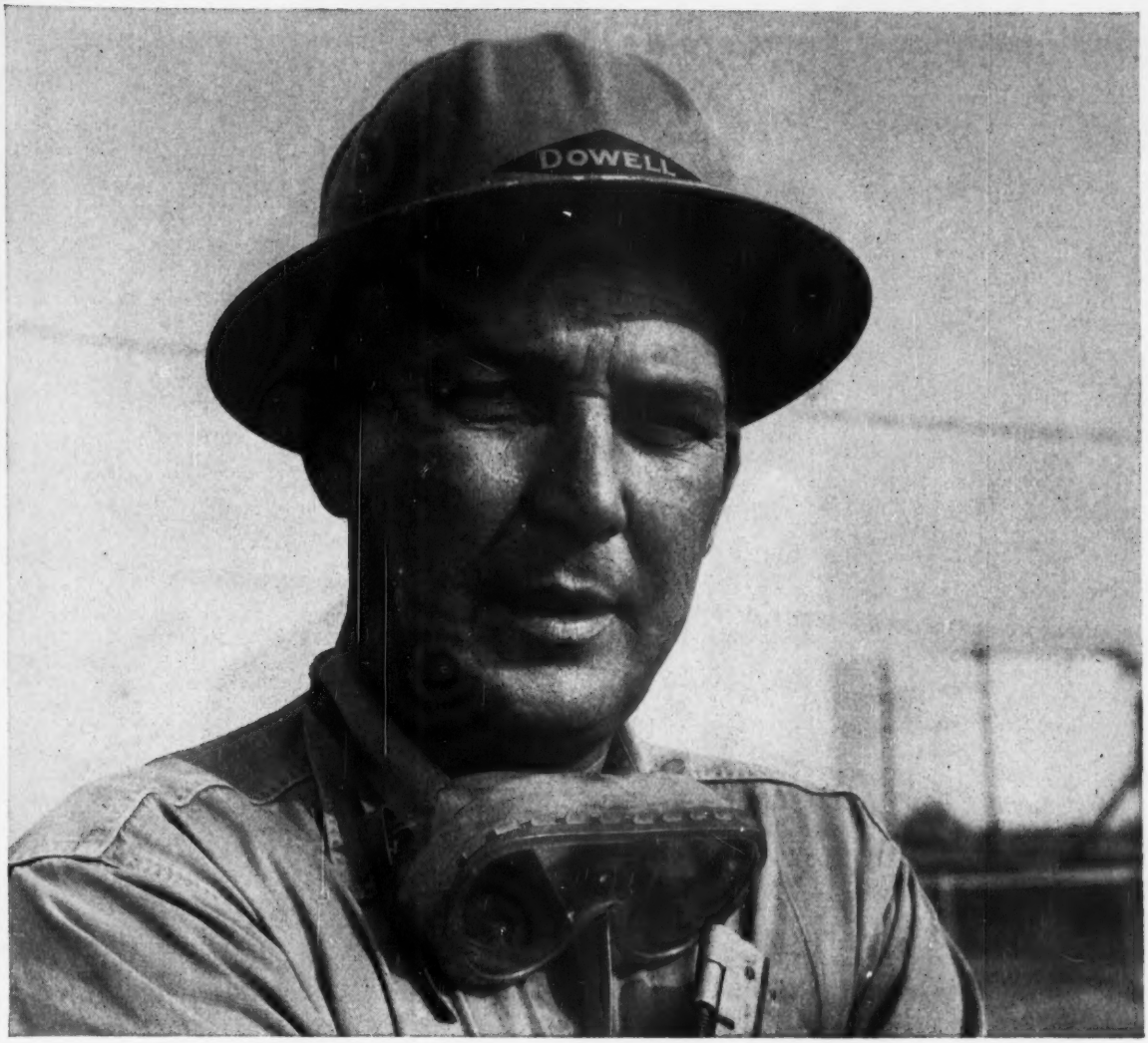

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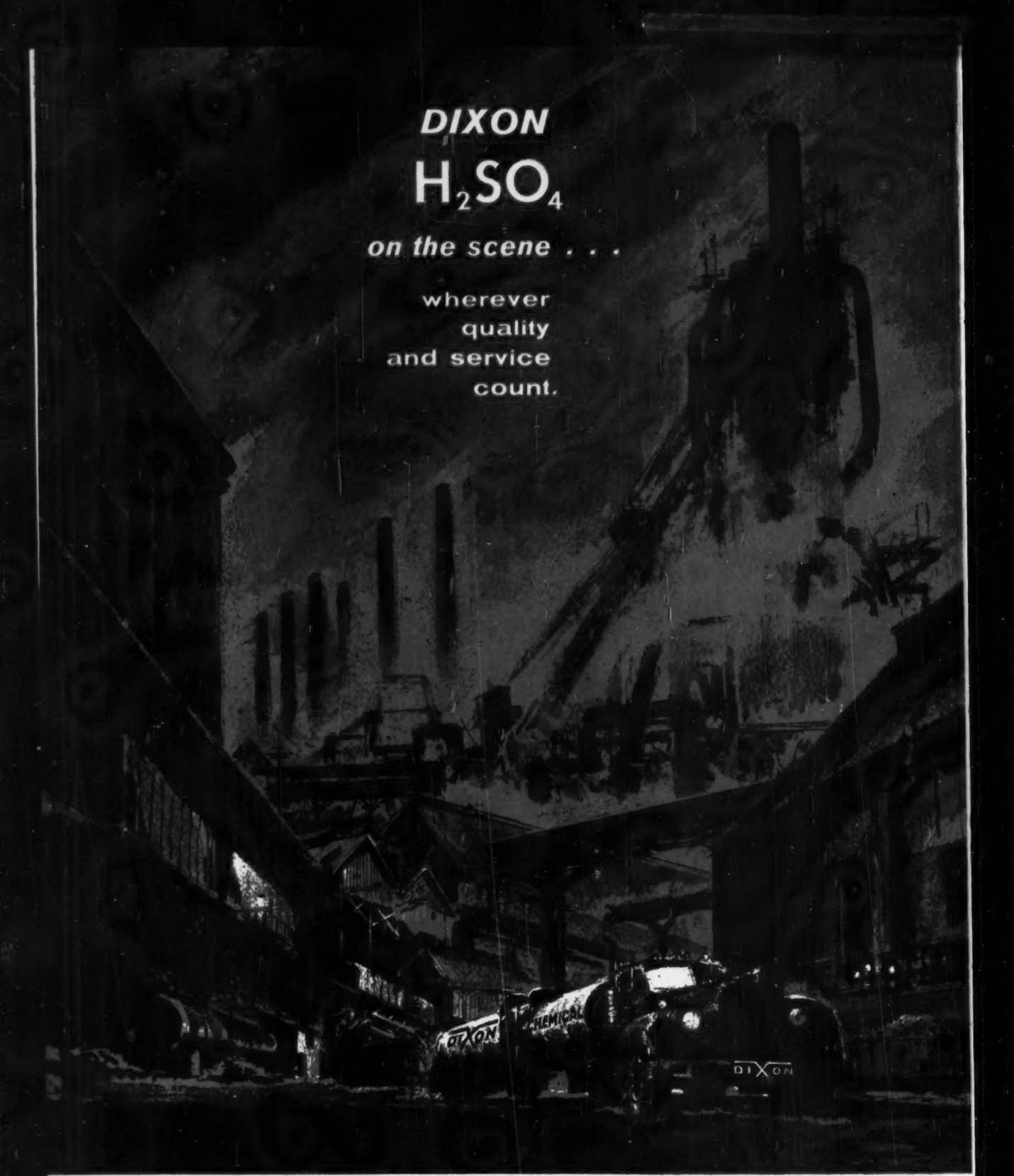

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Chemical Week

TOP OF THE WEEK **MARCH 21, 1959**

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- **Spurring plant operators' productivity:** Sun Oil's plan emphasizes worker individuality in pay and in pride ..... **p. 47**
- **Milk cartons hold big market potential for polyethylene**—but a lot depends on wax supply outlook ..... **p. 106**

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42,839 copies of this issue printed

Vol. 84
No. 12

Chemical Week is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York, 36, N. Y. Place of publication: 3rd and Hunting Park Ave., Philadelphia 40, Pa. Second-class postage paid at Philadelphia. Subscription: $3/year in U.S.A. Send subscription correspondence and change of address to Fulfillment Manager, Chemical Week. Please see page 9 for subscription requirements.

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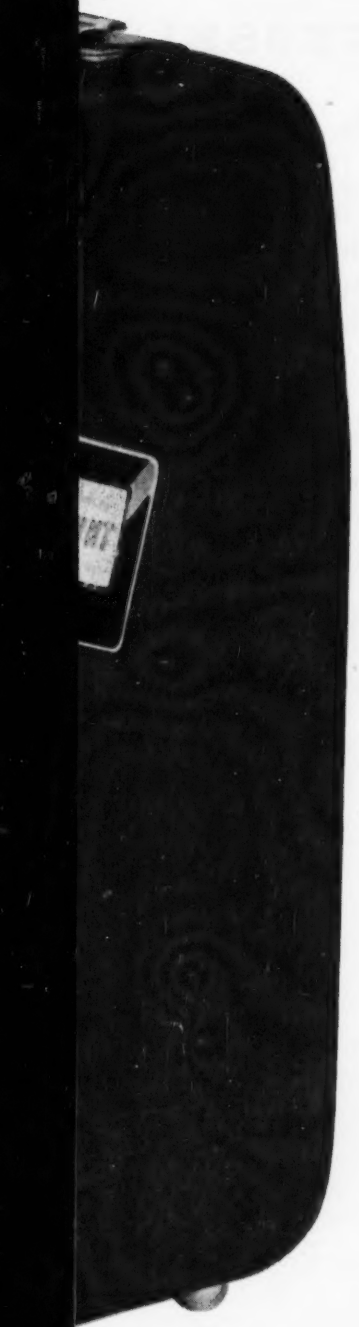

How to go places in reinforced plastics!

"As the Plastics Decade moves irrevocably into the Plastics Age, *chemistry has become the governing factor in giving plastics equal status with the natural materials"* — INDUSTRIAL DESIGN, October, 1958 (italics ours).

This quote is from a very thorough study of the problems, potential and people who are going places in reinforced plastics. As an important supplier to this industry, Reichhold believes this statement pinpoints the area where RCI creative chemistry can be *your* partner in progress. The same report also states:

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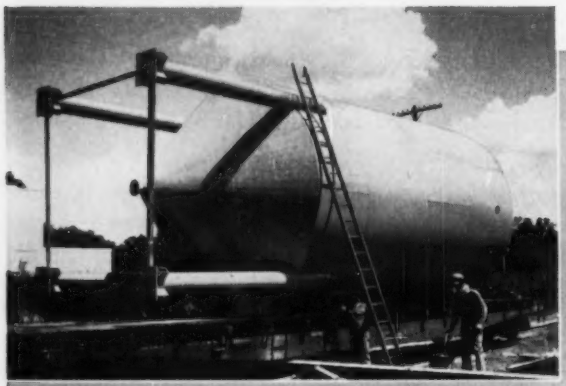
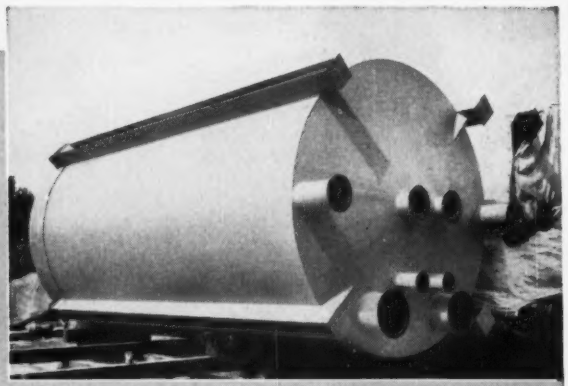
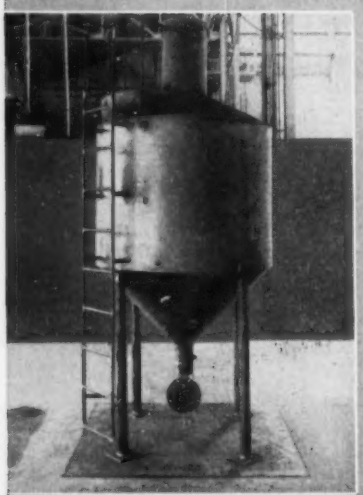


Sludge Settler tank for petrochemical plant is the first in this revolutionary new design.



Dual purpose phenolic-lined polyethylene storage tank with structural reinforcements.



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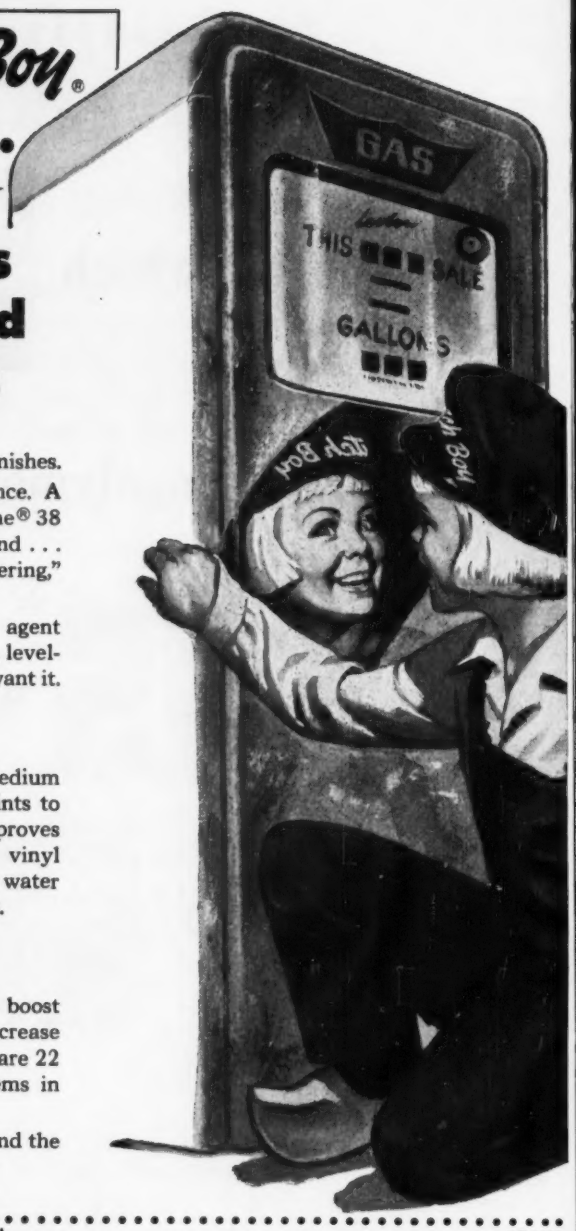

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MARCH 21, 1959 **Vol. 84, No. 12**

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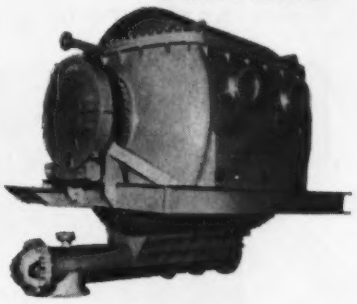

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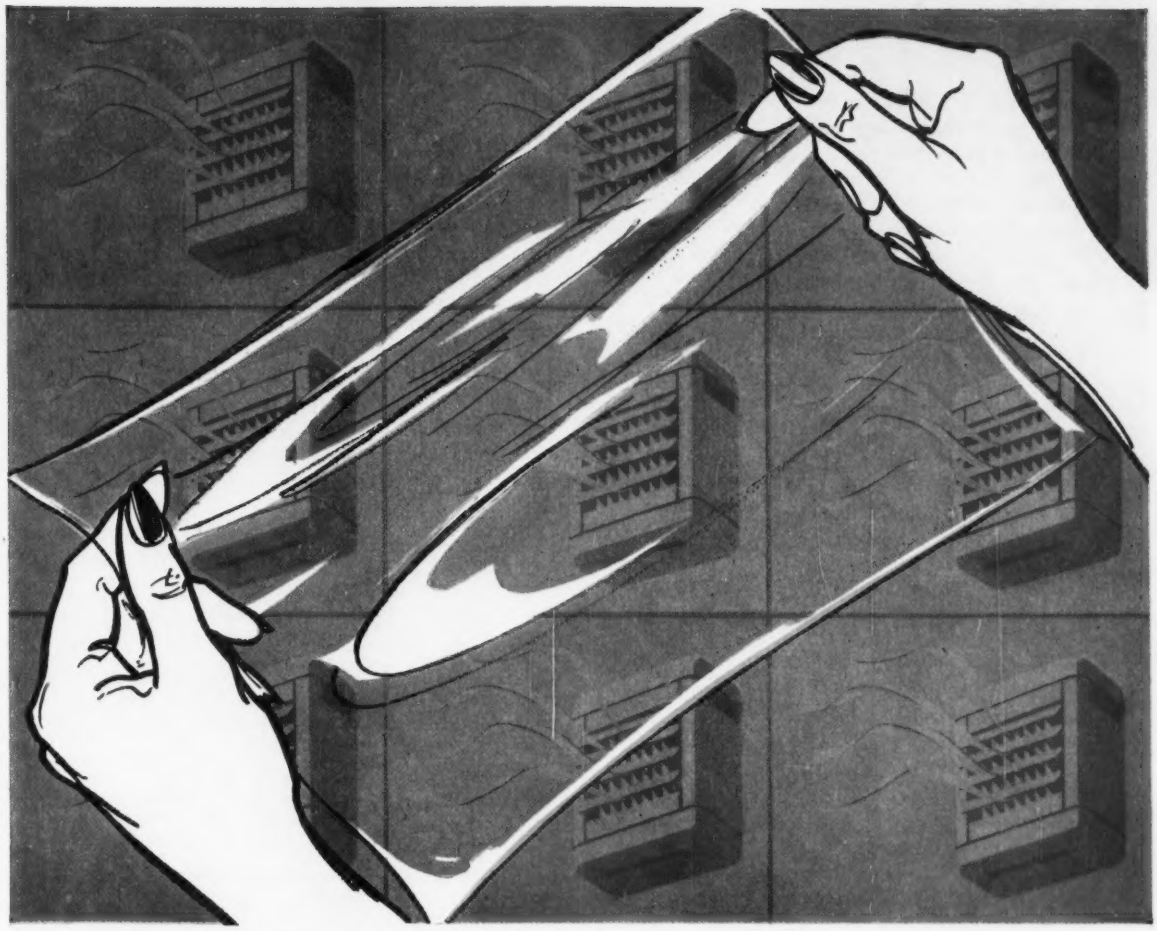

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LIKE A MILKING STOOL, an economic system with three legs must have the legs in proportion to maintain stability. The need for a balancing of three centers of economic power in the U.S. economy—the corporation, labor, government—was expressed by Spencer Chemical's Kenneth Spencer in a recent talk. He emphasized that corporations haven't recognized their responsibility in public affairs—in bringing balance to the policies that determine the future economic growth of the U.S. Here's how he puts it:

The businessman, who invests corporate time and stockholders' money in research for new products and more efficient processes to perpetuate his enterprise, should recognize that the same energy and foresight, devoted to public affairs, is equally important to his shareholders, his employees and his customers. For just as surely as technological developments will create new opportunities for economic growth, so will a favorable business climate.

If the businessman, in the best interests of the national welfare and his own company, is going to exert an influence for a favorable business climate, he must accept his full responsibility. Business will have to be fairly represented in the council of the political party—it really makes no difference which party. His role is to help improve the political organization, obtain better candidates in both parties, contribute financially to the party of his choice and encourage the people in his influence balance one another.

The evolution of our economic system has left us with three great centers of economic power—the government, the corporation and organized labor. We are fortunate that we have, in fact, developed a system that works best when the centers of influence balance one another.

But frankly, I think the hour is quite late for business to recognize its obligation in public affairs.

H. E. Johnson

Editor-in-Chief

Princeton Addenda

TO THE EDITOR: We would like to compliment you on your very complete story on research in Princeton and Mercer County (*CW, Feb. 21, p. 75*).

We were a little disappointed, however, to find our name missing from the list of companies conducting research in this area, while several of our competitors were included.

Our company has been in Mercer County for 55 years, and we are constantly making new developments and improvements in both hard rubber and plastics. . . .

M. J. KEARNEY, JR.
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TO THE EDITOR: You should be commended for your lively montage of Princeton's industrial activity.

Chemical Economic Services missed mention, I guess, because of its newness to Princeton last year. Our specialty: "custom studies in chemical market research." . . .

KENNETH R. KERN
Chemical Economic Services
Princeton, N.J.

Capitalizing: Pro and Con

TO THE EDITOR: It seems to me that the article "In Expansion, New Opportunity for Hiking Income" (*CW, Jan. 17, p. 31*) may be misleading. Willard Stanley states that there are advantages in capitalizing certain expenses such as interest, property taxes and research costs that occur during construction of new facilities. It is not clear whether he advocates this for both tax and reporting purposes or for reporting to stockholders only.

The methods discussed may be advantageous to public utilities but, if followed for both tax and reporting purposes, would be detrimental to industrial concerns. Each of the capitalization proposals would transfer a dollar of actual cash outlay from a credit against taxes in future years. Cash income is not affected and cash outlay for taxes is increased in the current year; the net effect is a reduction in funds available. Time is money and it is to the company's and the stockholders' advantage to defer taxes as long as possible. Since there is no over-all change in either taxes or income, these methods run counter to this principle. It is not usually considered an advantage to pay now rather than pay later.

It may be the intent of the author to recommend capitalization of expenses only for reporting to stockholders and not for tax purposes. This might be beneficial to the stock. Such capitalization can be justified if the reason is one of fairer allocation; it should not be used if the only reason is to raise reported income.

FRANK S. LYNDALL
Atlas Powder Co.
Wilmington, Del.

MEETINGS

Society of Plastics Industry, Pacific Coast Section, 16th annual conference, Hotel del Coronado, San Diego, Calif., March 25-27.

Packaging Institute, conferences on the recent food additives amendment to the U.S. Food and Drug Act.; Chicago, March 26; Los Angeles, April 6.

American Institute of Chemical Engineers, Philadelphia-Wilmington section; theme: new advances in chemical engineering practices; University Museum, University of Pennsylvania campus, Philadelphia, March 31.

Chemurgic Council, 24th annual conference, Congress Hotel, Chicago, April 1-3.

Fifth Nuclear Congress, Public Auditorium, Cleveland, April 5-10.

American Chemical Society, national meeting, Boston, April 5-10.

Chemical Institute of Canada, Analytical Chemistry Division, eighth regional conference, symposium on instrumental methods of analysis, Guildwood Inn, Sarnia, Ont., Canada, April 6-7.

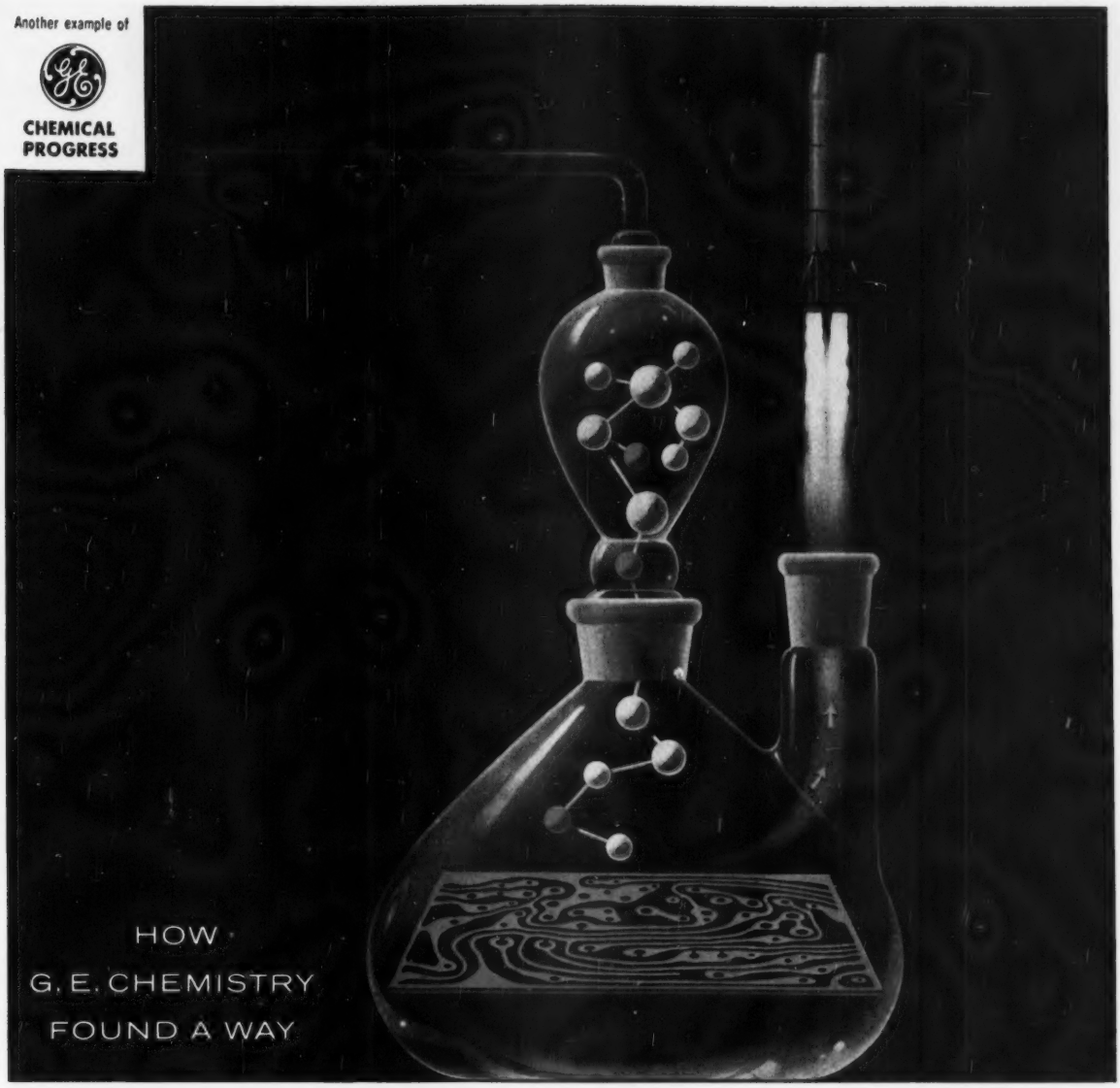
Instrument Society of America, second national symposium on chemical and petroleum instrumentation, St. Louis, Mo., April 6-7.

Metallurgical Society of the American Institute of Mining, Metallurgical and Petroleum Engineers, 42nd conference of the National Open Hearth Steel Committee, Sheraton-Jefferson Hotel, St. Louis, Mo., April 6-8.

American Institute of Chemical Engineers, annual one-day joint symposium of the Ohio, Pittsburgh and northern West Virginia sections; subject: catalysis; Mellon Institute, Pittsburgh, April 10.

Another example of

CHEMICAL PROGRESS



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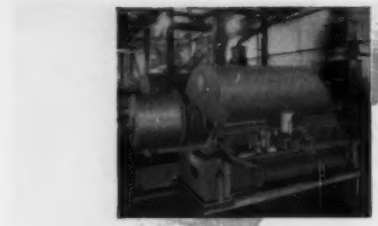

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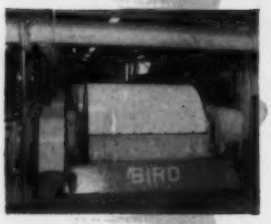

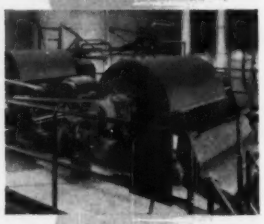

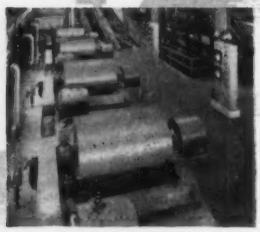

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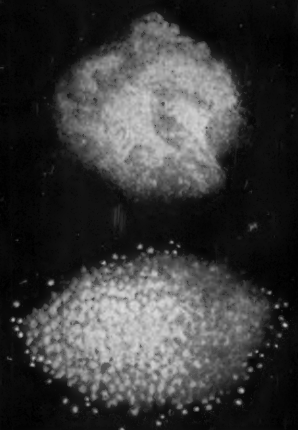

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Business Newsletter

CHEMICAL WEEK
March 21, 1959

Chemical companies plan to boost capital expenditures 6.8% this year, compared with '58's, the latest Commerce Dept. survey reveals.

Outlays by makers of chemicals and allied products are expected to total $1.41 billion this year, compared with $1.32 billion last year. Industry as a whole plans a 4.3% boost. First-quarter chemical expenditures are pegged at a seasonally adjusted annual rate of $1.29 billion, up 10.1% from fourth-quarter '58. That's under the $1.34-billion rate estimated in last fall's survey, but still the highest quarterly rate since second-quarter '58. Second-quarter spending is slated to accelerate still more, to a rate of $1.31 billion.

For all manufacturing, the first-quarter estimate is now $11.56 billion, up from the earlier prediction of $11.06 billion. Second-quarter spending is pegged at an annual rate of $12.25 billion.

Other CPI segments are also planning to spend more this year. Outlays are slated to go up 17.6% for paper and allied products, 13.9% for petroleum and coal products, 27.6% for rubber products. But nonferrous metals producers expect to slash spending 12%.

•

Texas Gulf Sulphur is beefing up its distribution system.

• Contracts have been let for $3 million worth of dredging and construction work to expand present marine shipping facilities on the Neches River, south of Beaumont, Tex. The project will make for "more efficient handling" of both molten and solid sulfur shipments, will provide for increased production at Spindletop Dome and additional production at the new Fannett Dome mine.

• Texas Gulf and De Bardeleben Marine Corp. (New Orleans) —a water transportation concern—are planning to establish a molten sulfur terminal at Tampa, Fla. This plan will involve use of an oceangoing vessel especially designed for shipment of molten sulfur. The ship—a Liberty vessel now being converted to hold 7,500 tons of molten sulfur—will be able to haul 8,000 tons of dry cargo (such as phosphate rock and other fertilizer commodities) on return trips from Tampa.

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Last year was a solid boom period for at least one chemical firm. Thiokol Chemical reports Rocket Division sales rose 62%, to $77.2 million, and Chemical Division sales climbed 43%, to $10.4 million, while net earnings mounted 45%, to $2.05/share.

Wyandotte Chemicals reports '58 sales of $82.1 million, off just 3.4% from the '57 peak. Recession and new plant startup costs caused earnings to drop 39.2%, to $2.9 million.

•

Another specialties acquisition: B. T. Babbitt (New York) is purchasing Savoy Car Shampoo from Seeman Brothers (New York).

Two new portents of mounting foreign chemical competition are looming on Europe's horizon, adding urgency to the scramble of U.S. producers seeking overseas footholds (*see p. 21*).

Montecatini laid the cornerstone last week for its $95-million, 700,000-metric-tons/year petrochemical plant at Brindisi. When it goes onstream some three years hence it will be Montecatini's sevènth petrochemical plant and the largest in Italy. Products: several plastics, including polyethylene, isotactic polypropylene, and polymers for synthetic fibers; aldehydes, alcohols and organic solvents.

ICI, meanwhile, is slowly unveiling details of its highly automated Severnside petrochemical complex (*CW, Jan. 24, p. 32*), which will be a "second Wilton"—only bigger. It will represent an investment of $70,000-84,000 on each of 5,000-6,000 employees. That means a total investment of $350-500 million, well above the $280 million previously reported. It's slated for full operation by '70.

•

Occasional mixups are to be expected when dealing in other countries, as Fluor Corp. can testify. At its annual shareholders' meeting last week, President J. S. Fluor happily announced that Mexico's petroleum agency, Pemex, had given Fluor verbal confirmation of a $50-million contract for Pemex's three long-heralded ammonia plants. But in Mexico, Pemex officials asserted no contractors had been selected as yet, that the plants would cost a total of only $20 million, of which $15 million in contracts would go to European companies.

•

In a crucial stage this week is the antibiotics antitrust case, with oral testimony from and about top-ranking executives and scientists of the five pharmaceutical companies that the Federal Trade Commission has accused of price-fixing and patent fraud.

During the first round of hearings—also held in New York—FTC lawyers introduced volumes of documentary evidence (*CW Business Newsletter, Jan. 31*) and are feeding more into the record during this second three-week session. But the feature of current hearings is the clashing over assertions from the witness stand.

First expert witness called by the government, which is presenting its side of the case first: Frank Stodola, organic chemist at the U.S. Dept. of Agriculture's regional laboratory at Peoria, Ill. FTC apparently intended to show through his testimony that Pfizer scientist Virgil Bogert—who in '52 analyzed chlortetracycline fermentation broths in connection with a Pfizer patent application—could have found recoverable amounts of tetracycline if he had used proper methods. Pfizer attorney Arthur Connolly cross-examined vigorously, challenging the testimony on grounds that it was based largely on theoretical assumptions.

The government is expected to complete its presentation during a third round of hearings, scheduled for June.

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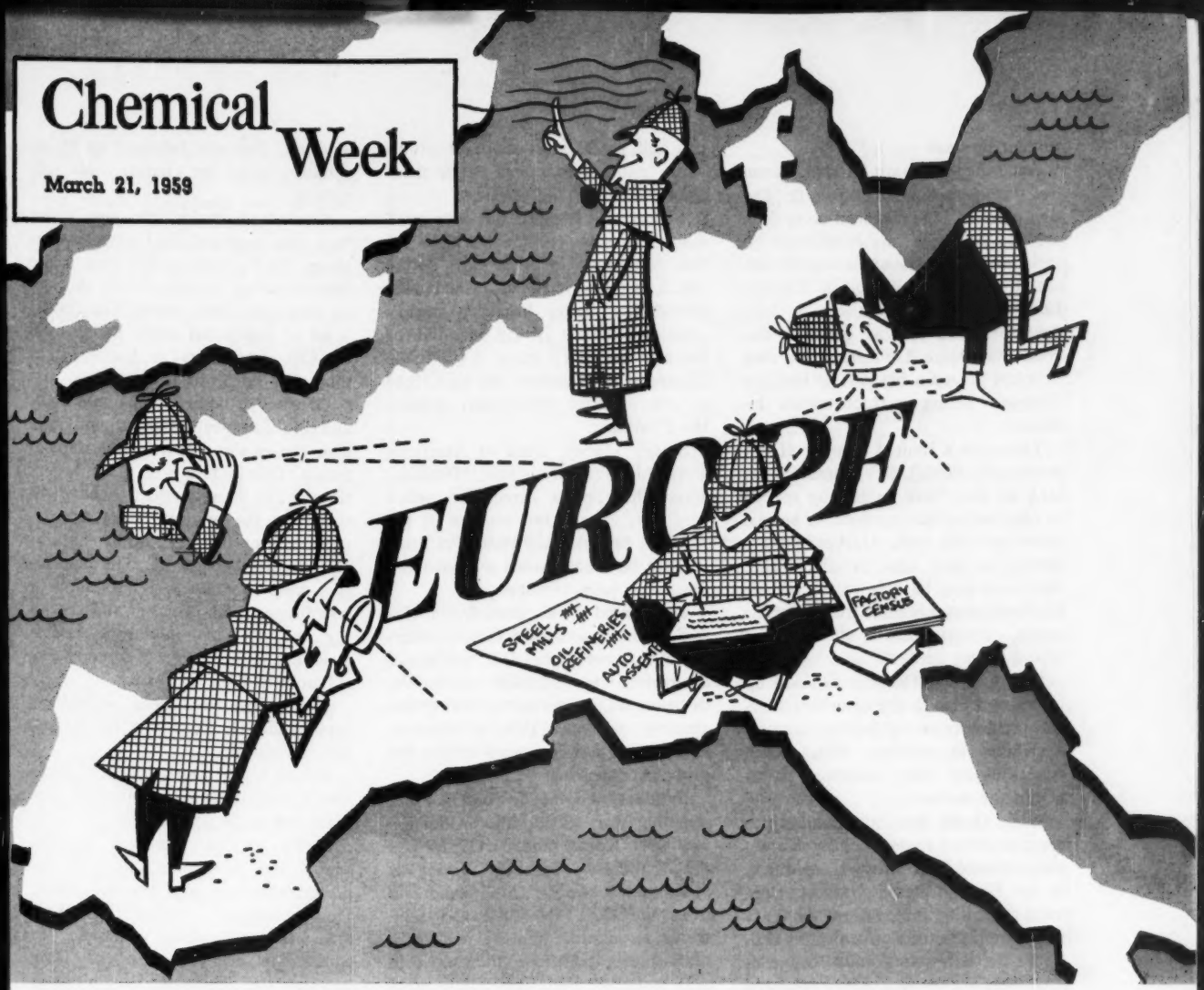
Chemical Week
March 21, 1959



In their drive for more business, agents of U.S. chemical firms examine Europe's market potential.

Reassessing European Sales Setups

U.S. chemical companies are in the race to cash in on growing European chemical markets. But tariff walls are rising, import and currency restrictions tightening, and a revitalized European chemical industry is driving for self-sufficiency. Facing U.S. companies is the question of how best to get around these obstacles.

A handful of events of the past few months show both U.S. industry's concern with Europe—and its varied plans for profiting from the European markets.

Du Pont, with its first plant outside the American continents still under construction, has upgraded its international organization to division status, set up a trading subsidiary in Switzerland, launched manufacturing projects in Holland (Orlon), Belgium (paint), and expansions in Argentina and Cuba.

Allied Chemical has set up a European office to back up sales efforts, acknowledges "we have to do something" about the "Common Market."

Other chemical companies also are organizing foreign campaigns. Dow, Pennsalt, Ansul, Pittsburgh Plate Glass, and Conoco have set up overseas subsidiaries to promote sales and expansion. Mallory has combined foreign operations in a new U.S.-based subsidiary; Atlas, in a new division.

Plants with U.S. capital and technology behind them are sprouting up all over Europe. In France, Texas Butadiene and Cabot have tied up with Shell-Saint Gobain to build a synthetic rubber plant; Conoco and Phillips have joined in a carbon-black project. In Belgium, Union Carbide reveals plans for its third European polyethylene plant.

In Turkey, Monsanto recently joined in a four-company venture to manufacture polyvinyl chloride, while its British subsidiary is set to build a maleic anhydride plant.

Other producers are weaving a network of licensing agreements across the Atlantic. And dozens of other companies are organizing, building, signing agreements in this newly intensified global competition.

Beyond the Familiar: But if there is purpose in the bustle, is there direction? Can U.S. companies find their way around the strange streets of the

foreign business world?

According to Ralph Landau, executive vice-president of Scientific Design, a lot of U.S. chemical companies are heading for disappointment if they expect tremendous opportunities for building plants in Europe. Europe's chemical industry is fully developed and just as good as this country's, claims Landau, whose own firm has played a big part in building Europe's young petrochemicals industry.

There are a limited number of opportunities for U.S. companies as long as they have something special to offer—a unique product, or special know-how—he says. Marketing techniques are one area in which U.S. producers may be able to teach their European partners some tricks. But, he warns, opportunities of all kinds are bound to dry up fast.

Says Landau: The way to make up for exports lost to the Common Market producers is by finding markets elsewhere—in Africa, Asia, South America—not by building plants within the walls.

Wide Open: But other authorities disagree with Landau. Gilbert Kornig and Edmund McCarthy, Jr., partners of the Foreign Research & Management consulting firm, believe there are many opportunities open for U.S. firms. Their reasoning: most European producers are not technically prepared for the mass production and mass marketing. New, large-scale plants must be built, and U.S. firms have a chance to contribute know-how and even capital—and to gain a substantial return.

But they think U.S. firms make a mistake by insisting on full or majority ownership of European plants. It is impossible, they assert, for a U.S. businessman to master the intricacies of European laws and bargaining by taking a few trips to Europe.

Kornig and McCarthy recommend setting up a base company in one of the "sanctuary" countries such as Switzerland or Liechtenstein, and then tieing in with European producers on a minority basis. This, they say, avoids the risk of getting tangled up in a multitude of licensing arrangements, running the risks of having a licensee walk away with a process, and also provides a reinvestment pool that's free of U.S. taxes. And by working as a minority partner, the U.S. company can still get a good share of profits while letting experienced native management handle the business.

Means to a Bigger End: Moreover, many European companies have extensive contacts in other parts of the world, especially Africa, which, the consultants claim, has the world's greatest industrial growth potential for the next five to 10 years. A profitable European partnership can thus lead to even greater opportunity outside the Continent.

Sidney Moody, head of American Cyanamid's International Division, agrees that license agreements aren't very satisfactory—not because of the risk, but because they yield slim profits. But he recommends a controlling interest in joint ventures.

Confronted with conflicting advice and a host of unknown factors affecting their every move, U.S. companies determined to establish themselves overseas are, on the whole, taking one gingerly step at a time. A close-up look at two new ventures reveals the problems involved.

Bulldozer Approach: For Du Pont, stepping into European production was what Kornig and McCarthy call the "bulldozer approach." From its distributor subsidiary in England and from the U.S., Du Pont can send teams to conduct market and technical studies in Europe, then move in on a vast scale. Both its neoprene plant in Northern Ireland and its Orlon plant in Holland will supply a ready market with "unique" products. The paint plant in Belgium is designed to take advantage of the burgeoning automotive industry. These are all new moves for Du Pont. Until the neoprene plant started going up, Du Pont's foreign plants were confined to Latin America and Canada.

Why did Du Pont change? For the past decade, European exports have been growing in importance, now account for most of Du Pont's $144-million (in '58) exports (8% of total unconsolidated sales). Total overseas sales, excluding the unconsolidated Canadian, Chilean and Argentinian operations, totaled $161 million, down slightly from '57's $163 million.

Gearing Up: Du Pont began its overseas step-up last year by boosting the international unit to full department status. Around the first of the year, the department was split up into a Latin-American and a European division. This was followed up by establishment of the Geneva sales subsidiary.

One of the major jobs now under way is to overhaul the European sales setup. Each operating department has been handling its own exports through its own sales department. The result: a lot of duplicated effort, and a total of 120 distributors in Europe handling Du Pont products.

Gradually, the new Swiss subsidiary and the European division will take over the export job from the departments. Distributors will place orders through the Swiss company, which will then buy the products from the departments or from Du Pont plants in Europe, as they go up. The centralized sales function will also allow a coordinated sales program and servicing. As new manufacturing subsidiaries are set up, they will serve as distributors in their own areas.

Eventually, the Swiss subsidiary may handle Du Pont sales for the entire sterling bloc.

Setting Up at Dow: Like Du Pont, Dow's international organization and plans are in "a state of flux."

Dow's overseas overhaul was revealed last September, when it reported it had set up a new subsidiary, Dow Chemical International Ltd. S.A., based in Caracas, Venezuela, "to consolidate overseas sales of Dow products and administer Dow business interests and investments abroad."

Then, last month, Dow revealed it had set up a Swiss subsidiary, Dow Chemie Aktiengesellschaft, to finance overseas operations. Actually, Dow Chemie was set up first, and is nominal owner of International.

Dow has been accumulating foreign manufacturing operations since '52, when it set up Dow Chemical International Ltd. and Dow Chemical Inter-American Ltd. (both Delaware corporations) to take over exports from the domestic divisions. International handled exports everywhere but to Canada (covered by an independent subsidiary) and Latin America, which was handled by Inter-American.

Heading both operations was Clayton Shoemaker. Under the new setup, Shoemaker, nearing retirement, remains head of Inter-American. The old International is being dissolved; International (Venezuela) is headed by L. "Ben" Branch, former head of the plastics division. Branch was also

named a director of the parent company, in charge of all overseas operations except in Canada and, at least for the time being, in Mexico. Shoemaker continues to handle Mexican operations, as president of Inter-American.

Finding the Way: "We have been probing for years for a system that fits our needs," Branch says. Behind the stepped-up drive overseas is the fact that Dow intends to protect the hefty export position it has built up since the war. During the past five years alone, exports rose an average 20%/year, in fiscal '58 accounted for 9% of total consolidated sales.

Since Dow's sales to Europe now account for some 35-40% of its total exports, moving into the Common Market is essential. But in other areas, Branch feels, urgency is also mounting to produce locally in order to hold markets.

Besides protecting overseas profits, Branch sees another strong reason for building up overseas production. "To get more mileage out of research," he says, and to make up for the domestic profit squeeze, a company will have to seize new opportunities—such as using its new processes in the Common Market. And, in general, the return on investment is higher abroad than in the U.S.

Dow is now studying a half-dozen projects in Europe. Whether they will be wholly or partly owned will depend on the individual situation. Many foreign companies have asked for a partnership with Dow, but want controlling interest. It would require exceptional circumstances for Dow to make that concession, Branch says.

'Natural' For Synthetics

Shell Chemical and U.S. Rubber gave the rubber industry plenty to speculate about this week, when they revealed plans for commercializing "synthetic natural rubber" (CW Business Newsletter, March 14). Biggest question mark: the process that will turn out a 30¢/lb. product.

Shell will make the synthetic at its Torrance, Calif., plant. U.S. Rubber will be its first customer, will make standard-size truck tires from the product.

Shell's synthesis of the hard-to-duplicate natural rubber molecule is no research coup—that was done more than three years ago by Goodrich-Gulf Chemical and since then by several other companies. But the proposed selling price—30¢/lb.—raised many corporate eyebrows.

How Shell plans to make the product—tabbed Shell Isoprene Rubber—for this price remains a mystery, even after last week's all-morning press conference at which some 40 reporters tossed questions at Shell President Richard McCurdy. McCurdy steadfastly replied, "We don't wish to discuss production costs at this time."

Reason for his reticence, he explained, is the uncertain patent situation. Shell—which is believed to have come up with new processing techniques—still isn't sure whether its operation is patentable. Until it gets a ruling, the process will stay under wraps.

Polyolefin Rival: Elsewhere on the "synthetic natural rubber scene," Phillips reports its new *cis*-polybutadiene is already in semicommercial production (500 tons/year). Phillips' price is $1/lb. But company officials point out that the cost can come down.

One spokesman puts it this way: "This is a development price. Our studies show that *cis*-polybutadiene can be made in large commercial quantities at a price no more than, and probably less than, that for polyisoprene."

Though the company has no firm plans for large-scale output, its researchers report that tire tests have been a "spectacular success" in proving the product superior to natural rubber in wear and heat buildup. If other tests yield comparable results, says a Phillips man, "large-scale commercial production is inevitable."

Alternate Replacements: And Firestone is going ahead, undaunted, with plans for a 30,000-tons/year plant to make its new natural rubber substitutes, Diene and Coral. Coral, made from polyisoprene, is touted as a complete replacement for natural rubber; Diene, produced from polybutadiene, is intended to be a partial replacement.

Though both are now produced for captive use, neither has been sold commercially. Thus, price is still uncertain. Diene, according to Akron newspaper reports, is expected to sell for "about 28¢/lb." Coral, according to one Firestone official, will be somewhat higher, "around 32¢/lb."

Plans for Goodyear's natural synthetic — tradenamed Natsyn — are less firm. The company has already completed a $750,000 pilot plant capable of turning out "tonnage quantities." So far, however, the product has been made for captive use only. And, although engineering studies for a new 25,000-30,000-tons/year plant got under way last September, no further steps have been taken.

Goodrich's Ameripol SN—another synthetic double for plantation rubber—has been available for several years, selling in experimental quantities for 50¢/lb. But so far, Goodrich reports, no company has made concrete plans to use it on a large scale. And Goodrich, itself, sees no immediate prospects for commercial production.

Synthetics Bid for Natural Rubber Markets

Company	Product	Current Price	Present Production	Planned Capacity
			tons/year	
Shell	Isoprene rubber	30¢/lb.	1,500	15,000-20,000
Phillips	Cis-4	$1/lb.	500	———
Firestone	Coral	**	pilot	30,000
	Diene	**		
Goodyear	Natsyn	**	pilot	25,000-30,000*
Goodrich	Ameripol SN	50¢/lb.	pilot	———

** Tentative; ** now produced for captive use only.*

COST-CUTTER'S TALLY CARDS

(Reductions in major expense items by 10 leading U.S. chemical companies—'58 vs. '57)

	Goods and Services	*Selling, Administrative*	*Employment Costs* (1) (2)	*Research and Development* (2)	*Federal Income Taxes*	*Cash Dividends*	*Capital Expenditures*
Allied Chemical	7.1%	(up 1.0%)	5.7%	**8.6%**	22.0%	(3)	16.2%
Atlas Powder	9.0%	(up 4.4%)	3.5%	**(up 19.1%)**	20.1% (4)	(3)	18.4%
Celanese	(up 16.3%)	(up 7.0%)	(up 6.6%)	(3)	(up 43.6%)	(3)	56.8%
Com'l. Solvents	2.8%	2.6%	(up 3.6%)	(3)	4.1%	70.2%	71.3%
Du Pont	1.8%	(up 5.5%)	(up 0.8%)	**(up 12.5%)**	30.5%	7.2%	(up 5.0%)
Hercules Powder	6.8% (5)	6.8% (5)	3.1%	**(up 6.3%)**	(3)	(3)	37.4%
Monsanto	0.9%	4.2%	(N. R.)	**(up 3.1%)**	22.8%	(3)	21.8%
Pennsalt	4.6%	3.2%	2.4%	**(N. R.)**	(up 13%) (6)	(3)	26.1%
Stauffer	(up 0.8%)	(up 3.6%)	(N. R.)	**15.8%**	(up 5%) (6)	(3)	13.6%
Union Carbide	9.2%	6.0%	6.2%	**(up 1.4%)**	8.2%	(3)	24.5%

(1) Wages and salaries plus pensions and other employee benefits—unless otherwise noted, included in Goods and Services and Selling, General and Administrative Expenses; (2) unless otherwise noted, included in Goods and Services and Selling, General and Administrative Expenses; (3) no significant change; (4) including U.S. and foreign corporate income taxes; (5) does not include wages and salaries for Hercules employees; (6) including federal, state and other income taxes; (N.R.) not reported.

How Research Escaped the Economy Axe

Research has become so esteemed in the chemical industry as a profit-producing function that laboratory allotments now escape the economy axe in cost-cutting periods. Moreover, they actually rise while the chips fly from most other budget items.

Strong new substantiation for this assessment of the enhanced prestige of research and development in the CPI comes this week from detailed financial data just reported by 10 large and medium-size producers of industrial chemicals (*table, above*).

In '58, according to annual statements to stockholders, these 10 companies reported aggregate sales and earnings down 4.8% and 14.5%, respectively, from '57 peaks.

In the retrenchment and cost-cutting programs that were prescribed by management, these (and most other) companies canceled orders for materials, cracked down on expense accounts, and whittled at plant and office overhead costs. They pruned payrolls 6.1% (a 13,108 drop in number of employees), and — with most major expansion programs rolling toward completion — reduced capital spending 14.3%.

Immune from Cutbacks: But what happened to R&D outlays in these companies' economy drives?

Two of the 10 companies pared research budgets by a total of $2.04 million, a 9.8% decrease. Three other companies stood pat on R&D allocations at their '57 levels. And the other five companies boosted their research investments by a total of nearly $13 million — so that for the 10 companies as a whole, R&D spending in '58 increased 5%, to $227.5 million.

This was nearly 4.4% of the companies' combined sales totals. In the preceding year, these companies put slightly less than 4% of aggregate volume into research work.

Drug Research Rising: In the pharmaceutical industry, for which '58 was generally a good year, research budgets have been rising rapidly. Three prominent makers of ethical drugs last week reported major increases in R&D spending from '57 to '58: G. D. Searle, 10%; Smith Kline & French, 14%; and Schering, 24%. Searle declines to disclose its research appropriations; but for the other two concerns, R&D outlays—totaling $17.2 million — were 8.5% of combined sales.

Mixed Employment Trends: Only two of the 10 chemical companies—Celanese and Commercial Solvents—increased both their total employment and their employment cost figures during the past year. In each case, the employment rise amounted to less than 50 new jobs. The other eight companies trimmed their staff and plant crews—exclusive of employees at government-owned plants and in overseas affiliates. Biggest relative force reduction: Carbide's 7.7% cut.

But employment costs were not falling at the same rate. In several cases, total employment costs held steady or even increased, despite the cutbacks in number of employees. Du Pont, for example, reports that even though it had some 5,000 fewer employees than in '57, it paid out during '58 the same amount in wages and salaries — $521 million — and 3.8% more in fringe benefits—$135 million.

COMPANIES

Kaiser Aluminum & Chemical Corp. and Mexico Refractories Co. (Mexico, Mo.) have agreed on merger terms. Mexico shareholders will receive 300,000 shares of Kaiser common stock and 150,000 shares of Kaiser 4¾% convertible preferred in exchange for all of Mexico's 861,865 outstanding common shares.

Mexico Refractories supplies fire clay, silica and alumina refractories to the steel, glass, cement and copper industries. The merger will broaden the line of Kaiser's chemical division, which sells basic refractories, made primarily from magnesia grains, to the same industries. Sales of both companies' refractory operations totaled $33 million in '58.

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National Plastic Products Co. (Odenton, Md.) has acquired Saran Yarns Co., former subsidiary of Dow Chemical Co. Saran's manufacturing facilities and laboratories will be combined with those of National. Sales price was not revealed.

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Olin Mathieson has leased Tennessee Products and Chemical Corp.'s idle Somerville Iron Works in Chattanooga, Tenn. The property is adjacent to Southern Electrical Co., part of Olin Mathieson's Metals Division. Southern's plant manager, H. D. Seaton, said no manufacturing operations are now planned for the area. Tennessee Products suspended production of cast iron pipe and fittings at the plant late in '57.

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Dumas Milner Corp. (Jackson, Miss.), producer of household cleaning products, will diversify into pharmaceuticals by acquiring Taylor Laboratories Inc. (Houston, Tex.) in a cash transaction. Taylor, manufacturer of ethical drugs, will operate as a wholly owned subsidiary of Dumas.

•

Witco Chemical Co. is merging its Emulsol Chemical Corp. (Chicago) subsidiary into the parent company's Organic Chemicals Division. Purpose is to widen distribution of Emulsol products through use of Witco's larger sales force. Emulsol's Chicago laboratories will be consolidated with those of Witco. Construction is under way to accommodate additional equipment and staff.

EXPANSION

Foam Rubber: American Foam Rubber Corp. (New York) leased a one-story building in Penndel, Pa., where it will add production and warehouse facilities to boost foam rubber output.

•

Gas Processing: Bay Petroleum Co., division of Tennessee Gas Transmission Co., will build a 50-million-cu.ft./day natural gas processing plant near Rockport, Tex. The plant will extract streams of propane, normal butane, isobutane and natural gasoline. Daily output: about 40,000 gal. Completion is scheduled for this fall. Contractor is O. L. Olsen Co. (Houston, Tex.).

•

Gypsum: National Gypsum Co. will boost the capacity of its Savannah, Ga., plant 25%. New construction is slated for completion this summer. According to Board Chairman Melvin Baker, the expanded facility will be "the largest gypsum plant in the world." Cost was not revealed.

•

Sulfuric Acid, Aluminum Sulfate: Dixon Chemical Industries Inc. is building a $5-million sulfuric acid plant in Paulsboro, N.J., plans a $2-million aluminum sulfate unit in Newark, N.J. The sulfuric plant is slated for completion in September, will have a capacity of 30,000 tons/year. Construction of the aluminum sulfate unit will be started later this year.

•

Paper: International Paper Co. will add a two-story "multimillion-dollar" building to house papermaking machinery at its Ticonderoga, N.Y., complex. Engineering surveys are now under way.

•

Aluminum: Aluminum Co. of America this week will reopen one of two idle potlines at its Rockdale, Tex., smelter "because of rising demand."

Alcoa also says it will accelerate bauxite mining operations at its Arkansas mines, will increase alumina output at refining plants in Bauxite, Ark., and Point Comfort, Tex.

FOREIGN

Chemicals/Russia: The British firm Vickers-Armstrong (Engineers) Ltd. has signed a $6.3-million contract to build a large chemical plant in Russia. Other details were not disclosed.

•

Fertilizer/Yugoslavia: The Italian firms Montecatini and Ansaldo have signed an agreement with a Yugoslav company, Rudnap, for construction of an $8.5-million nitrogen fertilizer plant at Lukavaz, Bosnia. The new unit will turn out 100 metric tons/day of anhydrous ammonia, 340 tons/day of nitric acid and 380 tons/day of calcium nitrate. Fauser-Montecatini processes will be used. Equipment and machinery will be supplied by Societa Ansaldo of Genoa.

•

Chemicals/Hungary: Hungary has greatly increased estimates of its planned investments in new chemical plants. For 1959-65, the government has budgeted $83.3 million for the chemical industry, compared with $25 million originally estimated.

Most of the new capital will go to the Tiszapalonka chemical combine at the southeast end of the Rumanian-Hungarian methane gas line.

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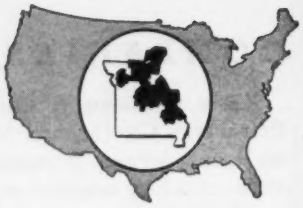
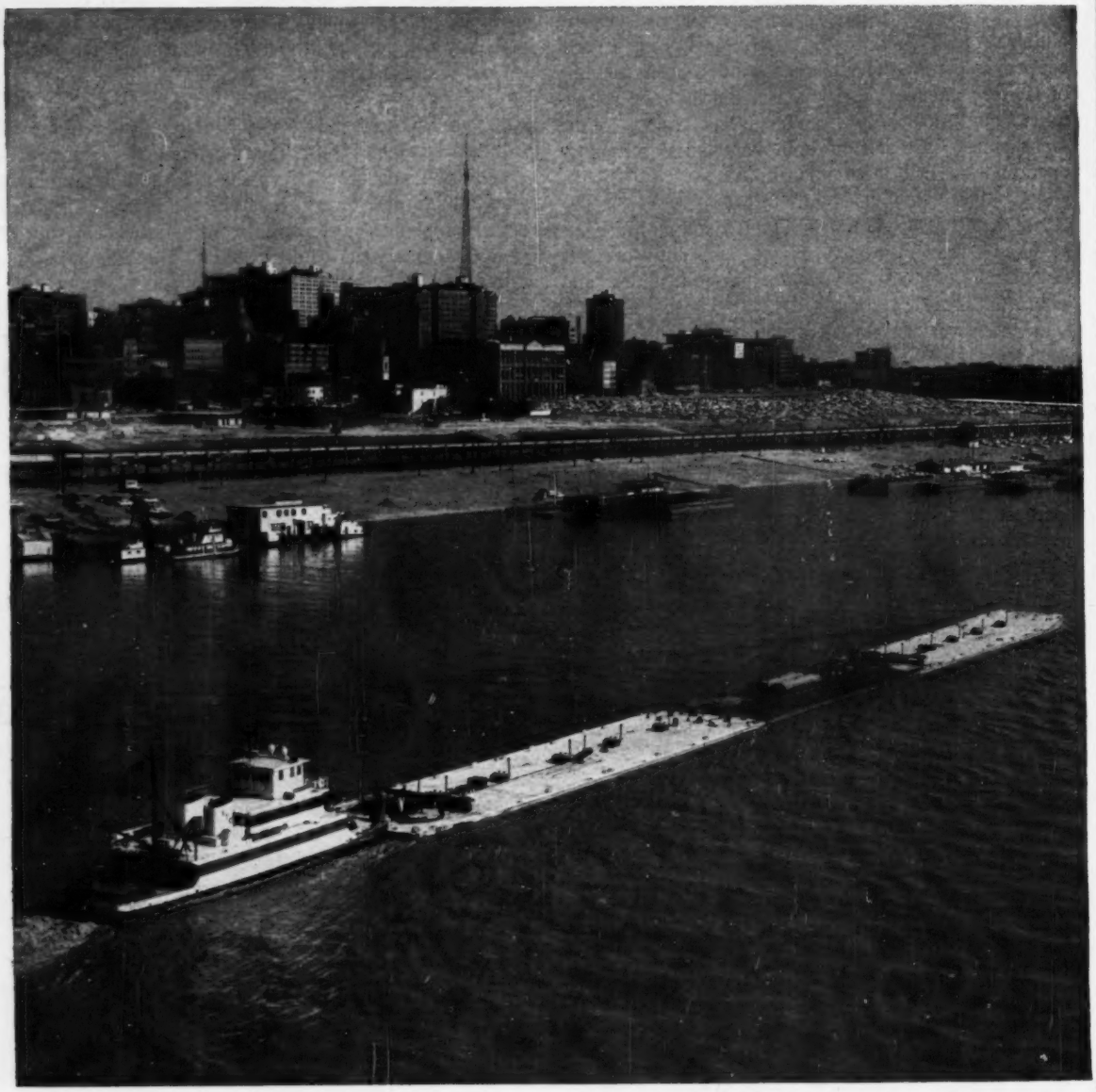




The mid-continent rivers make up the world's greatest inland waterway, connect 29 markets in 20 states.

contact: *J. E. Johanson, Manager, Industrial Development,*
UNION ELECTRIC CO., St. Louis 1, Mo.

Washington Newsletter

CHEMICAL WEEK
March 21, 1959

Various industries' fight to reduce or ban foreign competition in their domestic markets enters a new phase now that the oil industry has won its battle for a mandatory import quota system. This new barrier to imported products stirs up the free-trade vs. protection controversy all over again.

There were unexpected results for the oil industry itself, in the big victory it won from the Administration.

Oil companies find themselves under tighter price scrutiny than ever before in peacetime as a result of getting government help in fighting off low-cost foreign imports.

Eisenhower's emphasis on price control—which hits petroleum products as well as crude oil—came as a surprise to the industry.

The basic problem is that crude from the Middle-East and Venezuela, for instance, can be landed at East Coast ports at prices far below those quoted by domestic producers. While imports have risen, domestic output has been cut back sharply, to keep supply in line with demand. These cutbacks have been dynamite in the politically powerful oil-producing states. Now, mandatory quotas have been imposed on the grounds that increased imports may threaten national security.

But Eisenhower has also ordered Defense Mobilizer Leo Hoegh to determine whether any oil price increases are defensible. If they aren't, it's assumed that Eisenhower will open the spigot and let in enough more foreign oil to drive the domestic price back down.

The last general price hike on crude oil and its principal product, gasoline, came early in '58. It led to federal indictment of 29 oil companies on price-fixing charges—a case that hasn't yet come to trial.

The new quota plan restricts imports of finished products—including asphalt, gasoline, liquefied gases, jet fuel, naphtha, fuel oil and lubricating oil—for the first time; these products were not included in the voluntary program.

Residual fuel oil imports are not expected to be curtailed drastically from present levels, about 400,000 bbls./day.

Under the new program, total imports of crude oil and its principal products will be limited to less than 1.5 million bbls./day. In late '58, total imports averaged about 2 million bbls./day.

Biggest cutbacks will hit gasoline, which will be held to about 60,000 bbls./day instead of recent averages of 300,000 bbls., and imports of unfinished oils.

•

On the other hand, look at Eisenhower's tartrate decision. Last Saturday, the White House announced it had overruled the Tariff Com-

Washington Newsletter

(Continued)

mission on an "escape clause" action favoring Stauffer Chemical Co., which had asked that protective tariffs be raised on tartaric acid and cream of tartar imports. Eisenhower, in declining to impose higher duties, noted that Stauffer's tartrate producion amounted to less than 1% of the company's over-all production.

•

Chemical preservatives have been ruled out for frozen lemonade and probably will be banned for other frozen juices. Standards for lemonade, published by the Food and Drug Administration last week, are the first in the frozen food field. Look for a whole series of them in coming months, starting next with orange juice.

FDA attitude is going to be that unless a strong showing is made for need, preservatives won't be allowed—even though harmless. Lemonade people wanted to use preservatives in dispensing machines where the juice would be unrefrigerated. Standards go into effect in 60 days unless FDA receives objections that require public hearing.

The agency has been slow moving into the rapidly expanding frozen field with the same kind of standards that have applied for years to canned goods and other foods. Now that frozen products have been somewhat stabilized, however, officials figure it is time to take a look at the frozen food locker.

•

Congress will boost funds for liquid-propellent ICBMs. Democratic lawmakers—spurred on by Air Force generals—want more output of liquid-fueled missiles, pending development of the solid-propellent Minuteman. Talk is of a $700-million addition to the fiscal '60 budget.

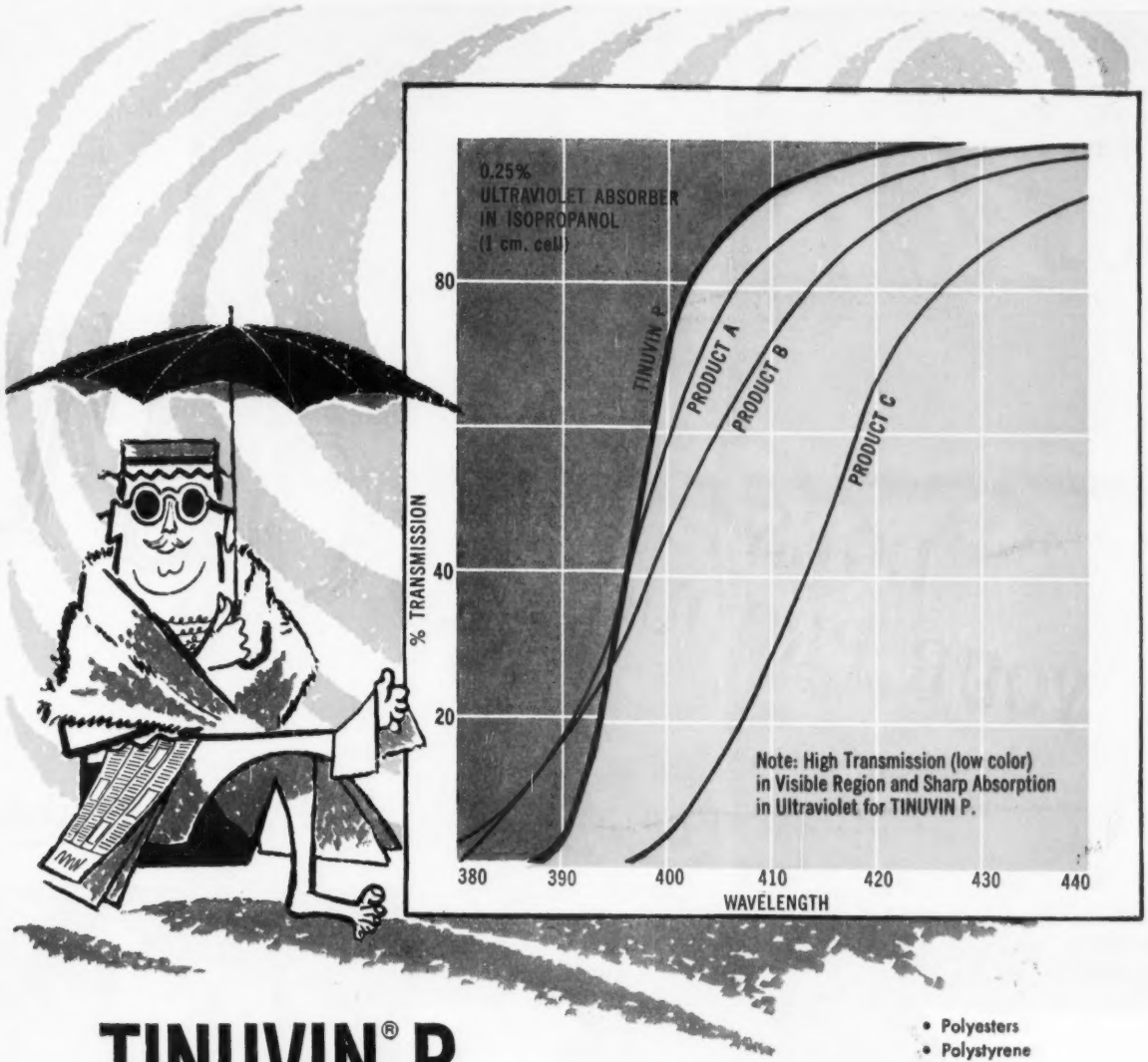
The Administration, so far, is unwilling to go beyond its present plans: nine Atlas (Rocketdyne propulsion) and 11 Titan (Aerojet propulsion) squadrons. If extra funds are voted, the Pentagon may accelerate production rates rather than expand schedules. Top defense officials are reluctant to invest more heavily in liquid-propulsion systems.

•

Bulk shippers are pleased with St. Lawrence Seaway tolls announced this week by the Canadian and U.S. governments. The rates—almost identical with those recommended last June in the joint report of the tolls committee for the two countries—set bulk fees at half of general cargo rates.

Minor changes have amplified and clarified the cargo definitions proposed last June. The principal change now defines bulk cargo to mean such goods as are loose or in mass and generally must be shoveled, pumped, blown, scooped or forked. The only commodity added to the bulk cargo list is raw sugar, loose or sacked.

Without excluding other commodities, certain cargoes are listed specifically as bulk. They include oil seeds, grain screenings, liquids carried in ships' tanks, woodpulp (loose or in bales), ores and minerals such as alumina, bauxite, phosphate rock, or sulfur.



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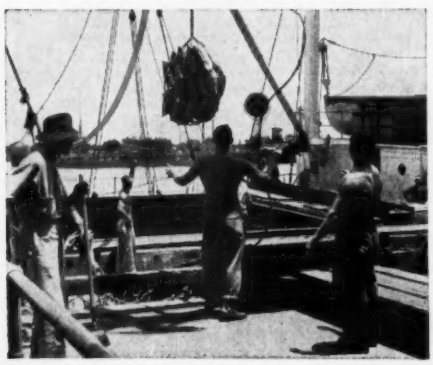

40¢ vs. $1.25 . . . WHAT A SAVING!—Typical experience with Bemis Waterproof Bags: A shipper of alumina (requires protection against moisture) needed a tough, economical export package. Bemis delivered bags costing about 40 cents each compared with $1.25 for the drums previously used. Bemis Waterproof Bags are the toughest shipping bags made.

WIDE WORLD PHOTO

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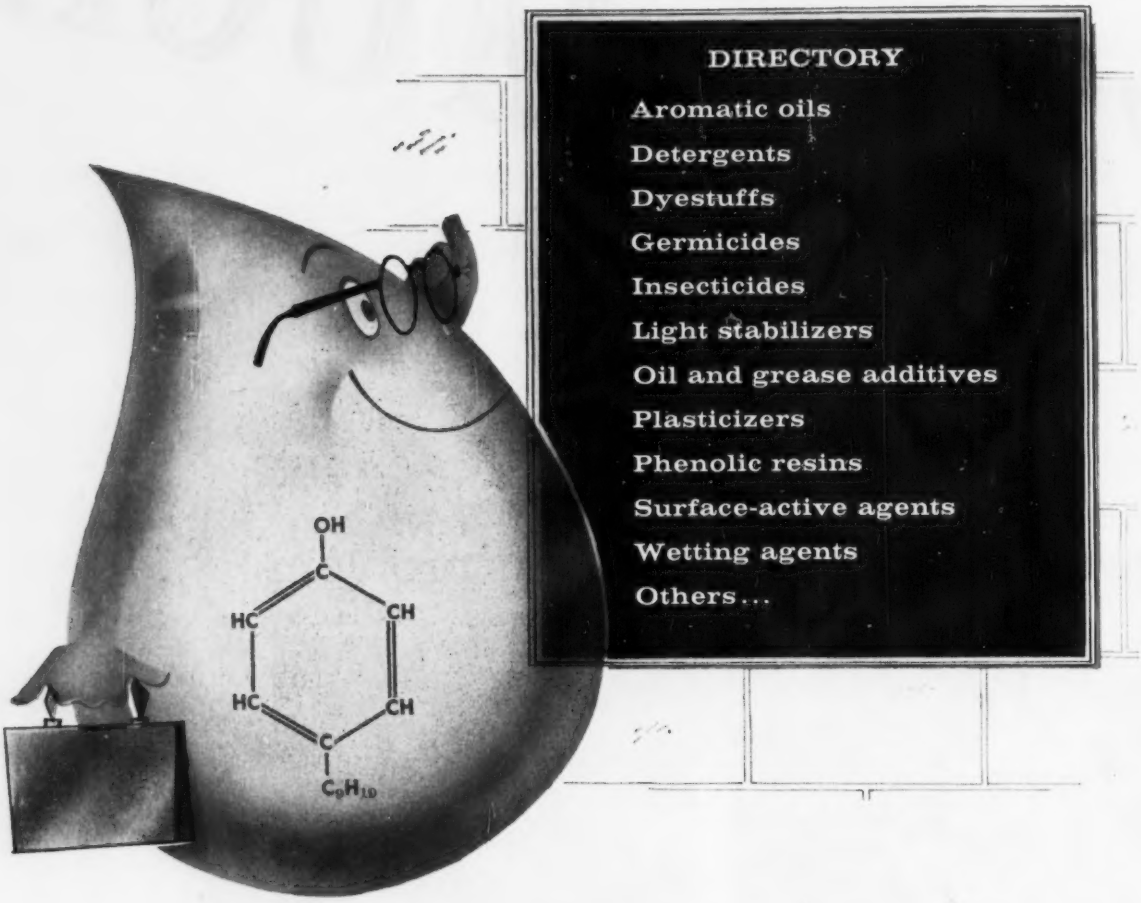

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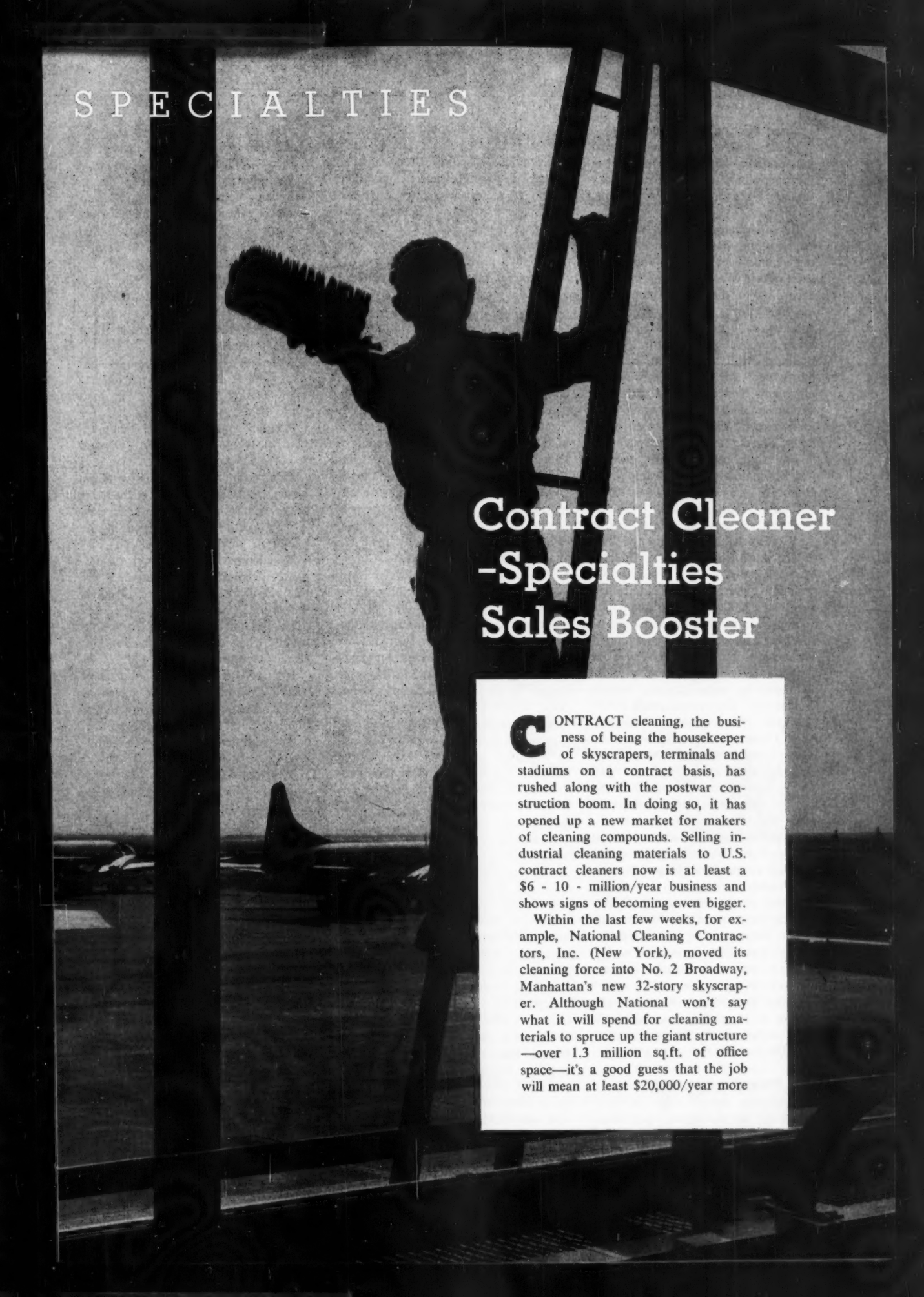


Contract Cleaner -Specialties Sales Booster

CONTRACT cleaning, the business of being the housekeeper of skyscrapers, terminals and stadiums on a contract basis, has rushed along with the postwar construction boom. In doing so, it has opened up a new market for makers of cleaning compounds. Selling industrial cleaning materials to U.S. contract cleaners now is at least a $6 - 10 - million/year business and shows signs of becoming even bigger.

Within the last few weeks, for example, National Cleaning Contractors, Inc. (New York), moved its cleaning force into No. 2 Broadway, Manhattan's new 32-story skyscraper. Although National won't say what it will spend for cleaning materials to spruce up the giant structure —over 1.3 million sq.ft. of office space—it's a good guess that the job will mean at least $20,000/year more

business for specialty makers.

While most owners of older buildings prefer to handle their own cleaning operations, owners of newer skyscrapers are turning to contract cleaners.

In Manhattan alone, contract housekeeping has taken over 90% of the giant office buildings constructed since World War II. During this time, according to the Real Estate Board of New York, 97 new skyscrapers containing 27 million sq.ft. of office space have been completed; 25 other buildings with 14 million sq.ft. of office space are now under way; and plans now filed call for 11 more new structures with a total area of 3 million sq.ft. This adds up to about 50 million sq.ft. of office space—45 million sq.ft. of which are, or soon will be, maintained by cleaning contractors.

Who's Who: Although there are hundreds of cleaning contractors in the U.S., a handful control the bulk of the business. American Building Maintenance Co. (San Francisco) is probably biggest in the field. It employs over 6,000, takes in about $20 million/year and spends about $750,000/year for cleaning compounds. The biggest contractors in New York City are National (it probably racks up about the same cleaning volume as American, also spends about $750,000/year for cleaning supplies), Allied Cleaning Contractors, Inc., and Handi-Man Co., Inc. Other large cleaning contractors include Terminal Cleaning Contractors, Inc., Gem Window Cleaning Co., Inc., Superior Office and Window Cleaning Corp., Gotham Window Cleaning Co. and Metropolitan Window and Office Cleaning Corp. (all headquartered in New York).

At first glance, the growth of contract cleaning should simplify the selling job for makers of building maintenance specialists. Instead of selling to each individual building owner, manager or superintendent, it would seem that the specialty maker should be able to make only one bulk sale to the contractor. It doesn't work that way. Here are a few of the reasons why:

No Rules: For one thing, contractors' buying habits differ widely. American, for example, purchases most of its supplies through an affiliated company—Easterday. And Allied has 75% of its 750,000-lbs. annual detergents requirement put up by a private-label house. Practically all other contract cleaners buy compounded materials through their own purchasing setups (almost none through the offices of their building-owner customers). Very few mix their own products.

Contract cleaning company executives do most of the buying of the compounds their firms use. In a few cases, the cleaning supervisor has a strong voice in the purchasing. Many companies feel that the supervisor is too easily influenced by salesmen.

Shun the Jobber: Larger cleaning contractors buy their major items directly from manufacturers, not from janitorial supply houses. According to one contractor's purchasing agent, "We can buy more supplies at a lower cost than a jobber in a fair-size city could. So why should we bother with them? At least 80% of the compounds we purchase come directly from the manufacturers."

Smaller contractors, however, prefer to buy through local jobbers, for two main reasons: first, they can get a complete line of materials; second, they get quick delivery. Fast delivery is important, since few contract cleaning companies have very much storage space. Some companies buy almost daily, depending on the supplier to deliver materials directly to the job site. Generally, however, contract cleaners buy enough materials to last two months. Practically all store their supplies at the job site. Most popular-size containers are the 5-gal. pail, and 55-gal. drum.

How Much and What: Contract cleaners' major needs differ widely. A contractor that maintains 1 million sq.ft. of asphalt flooring obviously would buy more resin finishes than a contractor that maintains 1 million sq.ft. of carpeted flooring. Most contractors purchase the same general cleaning items, however, in roughly the same proportions (see National's yearly shopping list, *p. 36*). Contract cleaners prefer resin polishes to waxes for at least 80% of their floor maintenance jobs, chiefly because of resins' antislip characteristics. Contractors' insurance costs are high (average is about 10% of their payroll). Therefore, any product that helps eliminate a potential danger spot is readily received. Two other reasons for using the resins, say the cleaners: they are easier to apply and they needn't be buffed—both are labor cost savers.

In industrial cleaning, as in the retail field, popularity of liquid detergents is gaining. Reason for this, according to cleaning contractors, is that the liquids do a good job, dissolve faster and aren't overused (as are the powders). Although use of liquids is growing, powders make up the bulk of detergents bought by contractors. Average cost of the powders is about 14¢/lb., liquids $1.75/gal.

Popularity of straight trisodium phosphate is dwindling. According to one cleaning contractor, "We don't use TSP anymore because it calls for too much supervision, and that's expensive. Dump in too much TSP, and it burns the floor."

Compounds for cleaning windows haven't much of a market in the giant housekeeping business. Water is used —with a little alcohol added in the winter to prevent freezing.

Brandnames: Contractors say brandnames account for less than 5% of total cleaning supplies used. Price is the primary buying guide. In a few cases, brandname products are used—usually when specified by the contract cleaner's customers.

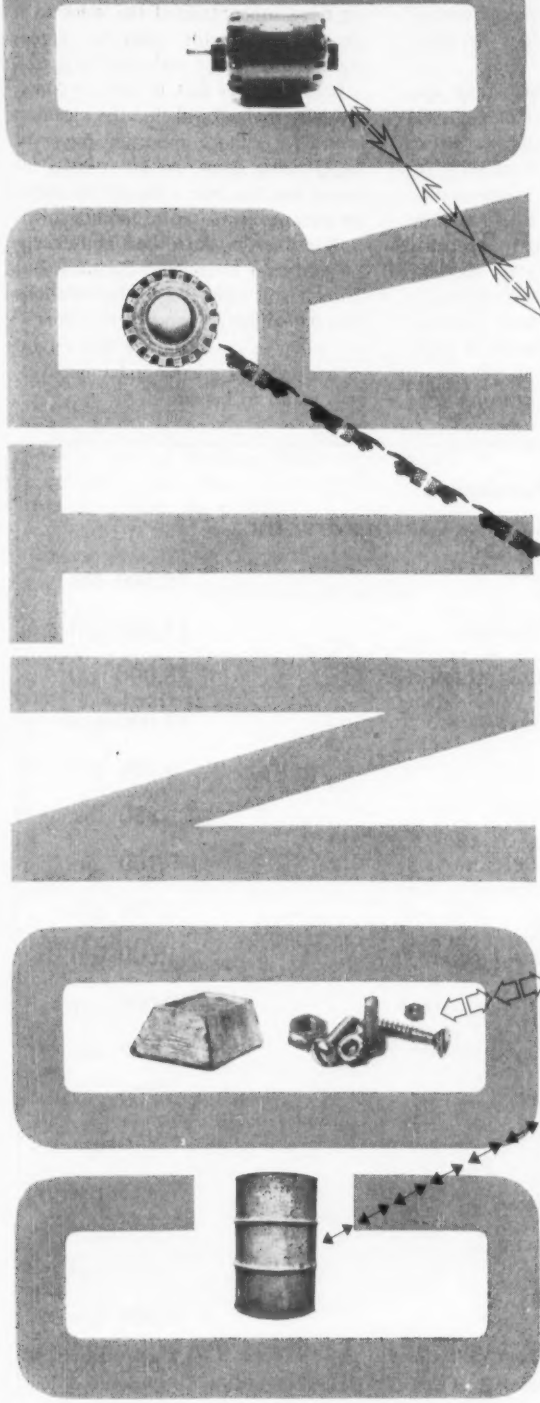
New products are constantly being tried by contract cleaners, all of whom watch sharply for laborsaving items. But less than 10% of the new products field-tested end up on the shopping list.

Most contractors operate on yearly contracts, which usually contain a 30-day cancellation clause, employ union labor. Supervision of men, as in most industries, is a big problem with contract cleaners, and top-notch supervisors are scarce. Most companies feel that there's more work incentive among cleaning men if supervisors are chosen from among company-trained scrubbers or waxers, and eventually promoted to supervising five or six large buildings.

Cleaning Specialists: In some cities, contract cleaners specialize in their work. Allied, for instance, handles the cleaning operations in most of Manhattan's posh Fifth Avenue stores (Bonwit Teller, Saks, Jay Thorpe, Hattie Carnegie, Lord & Taylor, De Pinna, among others). It also has important contracts with transportation terminals.

Handi-Man cleans banks—200 in

INVENTORY CONTROL



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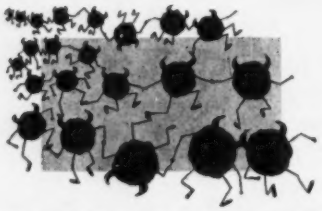

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DEPT. A

New York. National's bailiwick is large office buildings.

How much a contract cleaner charges varies greatly, depending upon the labor needed, total floor space, carpeting, and traffic, among other things. Yearly, over-all cost is as high as $1/sq.ft. of office space. But, according to American, average cost of maintaining a square foot of office space is around 50¢.

Join 'em or Fight 'em: Many specialty makers and jobbers of janitorial supplies have been reluctant to sell to cleaning contractors. According to suppliers, some contract businesses are run by what they term the "hoodlum element." And, say many specialty makers queried by *CW*, some cleaning contractors are so price-conscious it doesn't pay to go after their business. Also, they say, bill payment is often very slow.

But there are other reasons. One supplier told *CW*, "In a sense, we have regarded contract cleaners as competitors. They, too, are selling cleaning materials, along with a service. In the future, however, we may be adopting more of a 'join 'em if you can't fight 'em' attitude. We just worked out a cleaning contract with a local firm and we have subcontracted the work to a cleaning contractor, with the agreement that only our materials be used."

It all indicates that, in years to come, specialty makers will find the cleaning contractor a more important buyer of his cleaning items. As labor costs increase and become a bigger headache for management, more building owners are likely to turn their housekeeping jobs over to contract cleaners. But there is still room for better relations between suppliers and contractors—and when seller and buyer understand each other's problems and objectives, both stand to benefit.

Some Yearly Purchases of National Cleaning Contractors, Inc.

Dry soap powder		12,500 lbs.
All-purpose soap powder		15,000 lbs.
Floor finishes (resin emulsion)		48,000 gal.
Liquid floor-wax stripper		17,000 gal.
Wax		6,800 gal.
Paste Wax		850 lbs.
All-purpose metal cleaner		7,100 gal.
Metal cleaners		2,650 gal.
Marble and terrazzo cleaner		1,600 gal.
Scouring powder (14-oz. size)		30,000 cans
Heavy-duty scouring powder		1,400 lbs.
Ammonia		8,700 gal.
Bleach		7,200 qts.
Furniture polish	(water emulsion)	128 gal.
	(oil based)	144 gal.
Pine disinfectant		672 gal.
Fuller's earth		6,800 lbs.
Green dust		8,500 lbs.

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Heard the news about *International* magnesium oxide? Highest purity ever achieved in carload quantities . . . purity you'd expect to find only in laboratory-controlled samples. And it's in the low price range!

Not to mention wide application. Among its uses: As a stabilizing and vulcanizing agent for rubber . . . in high-grade ceramic and glass formulations . . . for acid neutralization, electrical insulation, uranium ore treatment. It has demonstrated its worth in both high-purity magnesium chemicals and in low-sulfate, high-magnesium catalysts. What's more, *International* MgO has proved preferable to magnesia produced by conventional methods. And there's still more to come through *International* research.

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CHEMICAL SPECIFICATIONS

Chemical		Purity Range
MAGNESIUM OXIDE	MgO	99.40 — 99.70%
IRON	Fe_2O_3	0.03 — 0.06%
LIME	CaO	0.07 — 0.08%
ACID INSOL.*		0.02 — 0.10%
OXIDES**	R_2O_3	0.04 — 0.09%
BORON	B_2O_3	0.0025 — 0.015%
CHLORIDE	Cl	0.015 — 0.06%
SULFATE	SO_4	0.02 — 0.07%
SODIUM AND POTASSIUM	Na-K	0.02 — 0.07%
LOSS ON IGNITION		Nil

*Mainly SiO_2 **Other than Fe_2O_3

LABORATORY PURITY...

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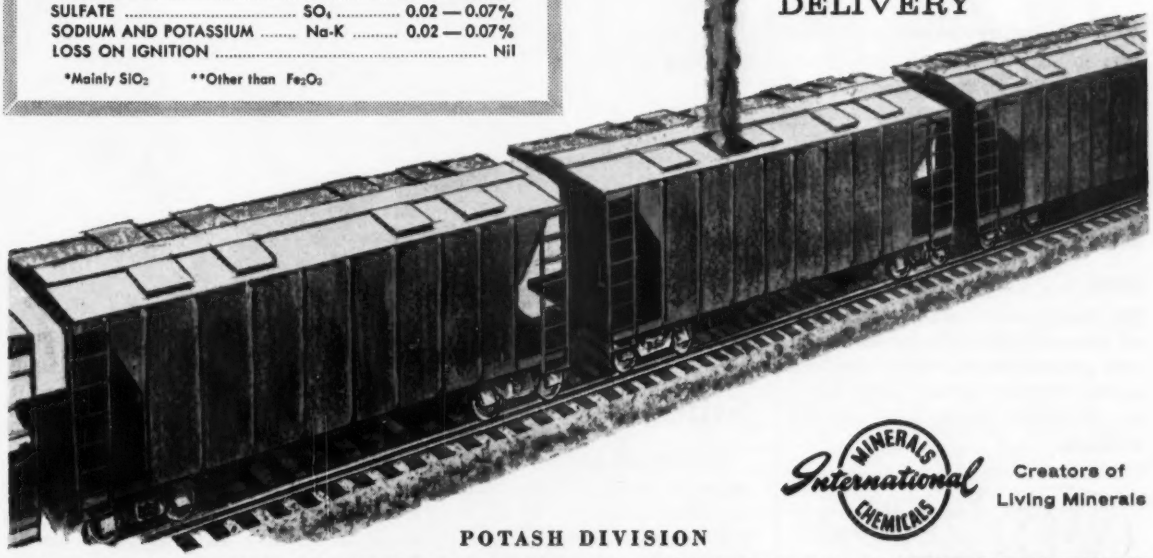

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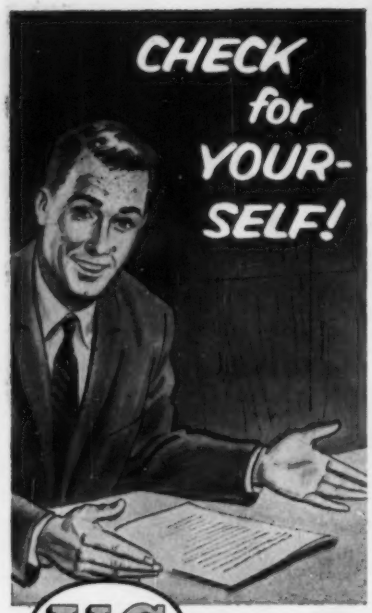

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Bigger Squirts

Metering valves for aerosols until recently could dispense only minute bursts of spray. Now a valve has been developed that will measure out and dispense up to 2,500 milligrams (2.5 cc.) of container content. Risdon Manufacturing developed the large-capacity valve, calls it the Magna-Meter. It can dispense foam, spray or liquid products, can be used to spray water-based aerosols, Risdon says, and performs satisfactorily with all propellents, including nitrogen. Still-larger-capacity metering valves are in the offing, according to company spokesmen.

Vinyl-Steel Glues

A new metal coating system for bonding vinyl to metal has been worked out by B. F. Goodrich Co. The system features a new adhesive, A-978-B, which allows sheet steel bonded to vinyl to be stretched 35% without weakening the bond or damaging the vinyl coating. The adhesive is a white, thin-viscosity, solvent-based solution with 28-32% solids. It can be applied by brush, float or roller; 1 gal. will cover approximately 317 sq.ft. The adhesive must be baked—at 400 F for 10 minutes.

Another adhesive for the same sort of applications has been marketed by Stanley Chemical Co. (East Berlin, Conn.). Also a thermosetting material, Stanley 69X-1487 is solvent-based, is sold in solutions of about 22% solids.

Permanents for Wool

Last week, the Wool Bureau, Inc., disclosed details on its Si-Ro-Set permanent creasing and pleating process for wool. The process, essentially similar to the process used in home-permanent waves, involves spraying garments with a solution of ammonium thioglycolate.

The Si-Ro-Set process, offered royalty-free to manufacturers of men's and women's clothing, was developed in Australia and adapted to U.S. production methods by the Wool Bureau. According to the bureau, Lackawanna Pants Manufacturing Co. (Scranton, Pa.) is already using the new

Silicones Cast in an Anticrime Role

The difficult problem of lifting fingerprints from irregular surfaces has been made a lot easier by use of liquefied silicone casting rubber. Identified as RC-type silicone rubber by its developer, Dow Corning Corp., the new liquid material solidifies into a rubbery mass in less than five minutes. It flows into hairline cracks, accurately reproducing every marking on virtually any surface. It can be poured at most temperatures, makes possible the casting of impressions in snow or slush.

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SPECIALTIES

process. It is using standard pressing equipment, and can now turn out more than 1,000 permanently creased wool pants daily. Gerald Laxer, director of the bureau's science department, says that total cost (including labor) of using the Si-Ro-Set process on wool trousers is roughly 15-25¢/-pair.

Evans Chemetics, Inc. (New York), Summit Chemical Products Corp. (Belleville, N.J.), Morton Chemical Co. (Ringwood, Ill.) and Halby Products Co. (Wilmington, Del.) are supplying the ammonium thioglycolate used in the process.

PRODUCTS

Push-Button Rust Resistance: Rust-Oleum Corp. (2799 Oakton St., Evanston, Ill.) has a new spray-on rust-preventive coating. The aerosol coating comes in 16 colors as well as transparent.

•

Molding Resin: Acme Resin Corp. (Forest Park, Ill.) has added two new Fiberglas diallyl phthalate molding compounds to its list of dielectric molding materials. Designated Acme 1-530 and Acme 1-520, they carry military approval as Type GDI-30 (Mil-M-19833 Ships) and Type SDG (Mil-M-1879A Navy).

•

Epoxy Stripper: Resin Formulators (8956 National Blvd., Los Angeles) has a new solvent, Resinform RF837 Solvent Stripper, which it claims will selectively remove epoxy and polyester resins. It's said not to corrode, discolor or otherwise affect copper, aluminum, ferrous metals, or enamels based on other resins.

•

Joiner: A new alloy for joining steel, nickel, stainless steel, copper, Monel, aluminum bronze, beryllium copper, Elkonite and aluminum, or any combination of these metals, has been developed by American Brazing Alloys Co. (P.O. Box 11, Pelham, N.Y.). It's called Ambraze 4300, can be used with torch or soldering iron. It has a melting point of 425 F., tensile strength of 14,000 psi.

•

Double Debut: Fremont Industries (219 W. 90th St., Minneapolis) has introduced two new cleaning compounds: Compound 63 B, a phosphating cleaner for dip-tank operation,

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Facts and figures on benzene, toluene, xylene industry $1 ☐

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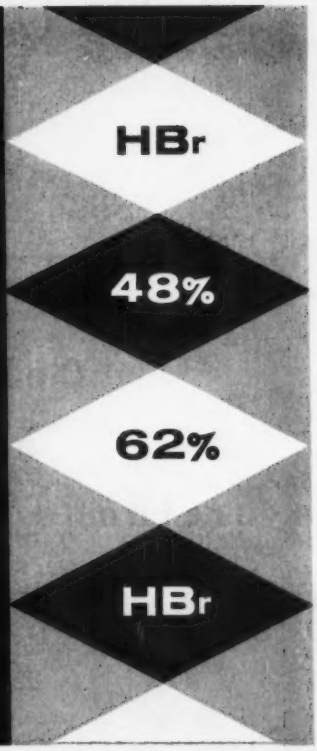
Hydrobromic Acid



Can help you make drugs, dyes, fluxes, perfumes, photo chemicals

Check these useful reactions: Hydrobromic acid is a strong acid which reacts readily with most inorganic bases to produce inorganic bromides such as lithium, sodium, potassium and ammonium bromide, useful in photographic processes.

It reacts with many aliphatic alcohols in the presence of dehydrating agents to produce aliphatic bromides. Aliphatic bromides, which are generally more reactive than the corresponding chlorides, are useful in the preparation of Grignard reagents and other organometallic bromides, quaternary ammonium salts and as alkylating agents.

Hydrobromic acid can be used to cleave ethers to produce aliphatic alcohol and bromide. It will also react with epoxides to produce vicinal bromohydrins with two reactive centers, thus, permitting many additional reactive possibilities.

Ask for our help: Michigan Chemical produces 48% Technical Grade Hydrobromic Acid and is the sole producer of 62% Technical Grade Hydrobromic Acid in commercial quantities. Our wide experience in bromine and bromine derivatives is immediately available to you through our Technical Service Group. Our plants in Saint Louis, Michigan and El Dorado, Arkansas provide dependable sources for high purity bromine chemicals in constant supply—up to tank car quantities, if desired. Write us about your area of interest or for technical data and prices.

Analysis:	48% Technical
Molecular Weight:	80.924
Specific Gravity at 20/4° C:	1.488
Pounds a gallon at 20° C:	12.4
HCl, not more than:	0.10%
Vapor Pressure at 30° C:	——
Vapor Pressure at 50° C:	——

Analysis:	62% Technical
Molecular Weight:	80.924
Specific Gravity at 20/4° C:	1.74
Pounds a gallon at 20° C:	14.5
HCl, not more than:	0.15%
Vapor Pressure at 30° C:	85 mm
Vapor Pressure at 50° C:	380 mm

For complete listing of Michigan Chemical products, see your copy of Chemical Materials Catalog or Chemical Week Buyers Guide.

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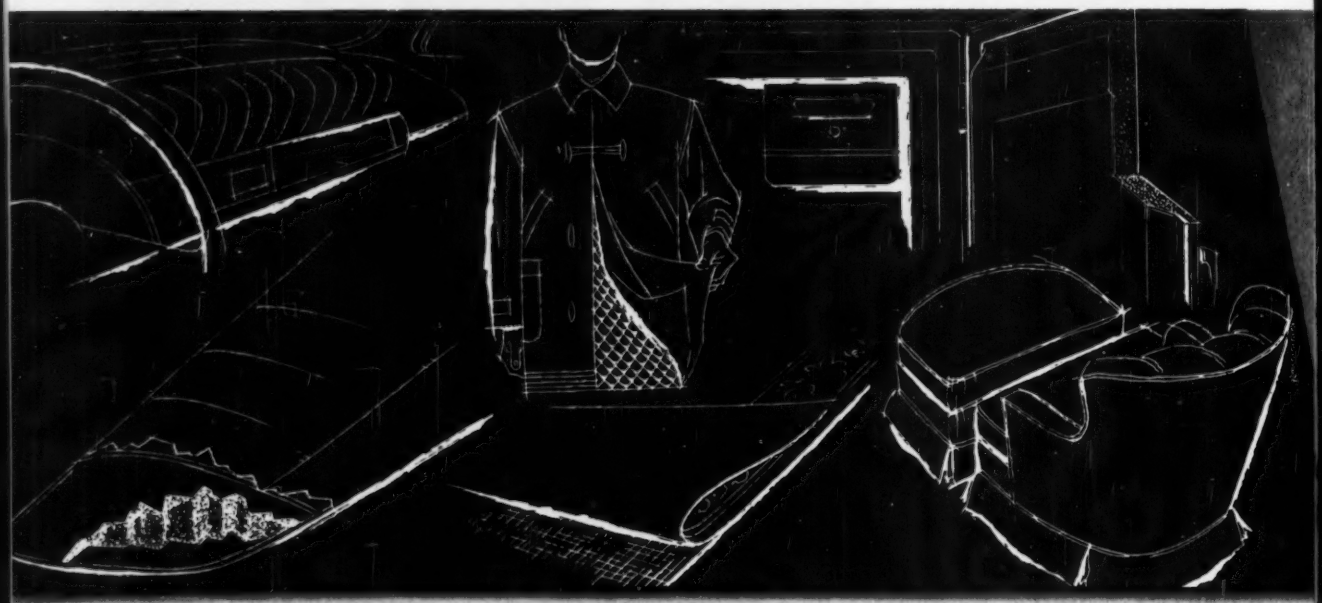

Left to right:

- CRASH PADDING
- AIRCRAFT CONSTRUCTION
- CLOTHING INTERLINERS
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- FURNITURE CUSHIONING
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To make urethane foam, rigid or resilient, you need a polyol. This is where an increasing portion of Celanese' 15 million lbs. capacity of trimethylolpropane is going, and where the Celanese low price is helping manufacturers of urethane foams and coatings to flatten costs and meet the competition of other materials.

The same with alkyd resins—another end use where Celanese trimethylolpropane's high production and low price have enabled paint and coatings manufacturers to plan ahead with more confidence.

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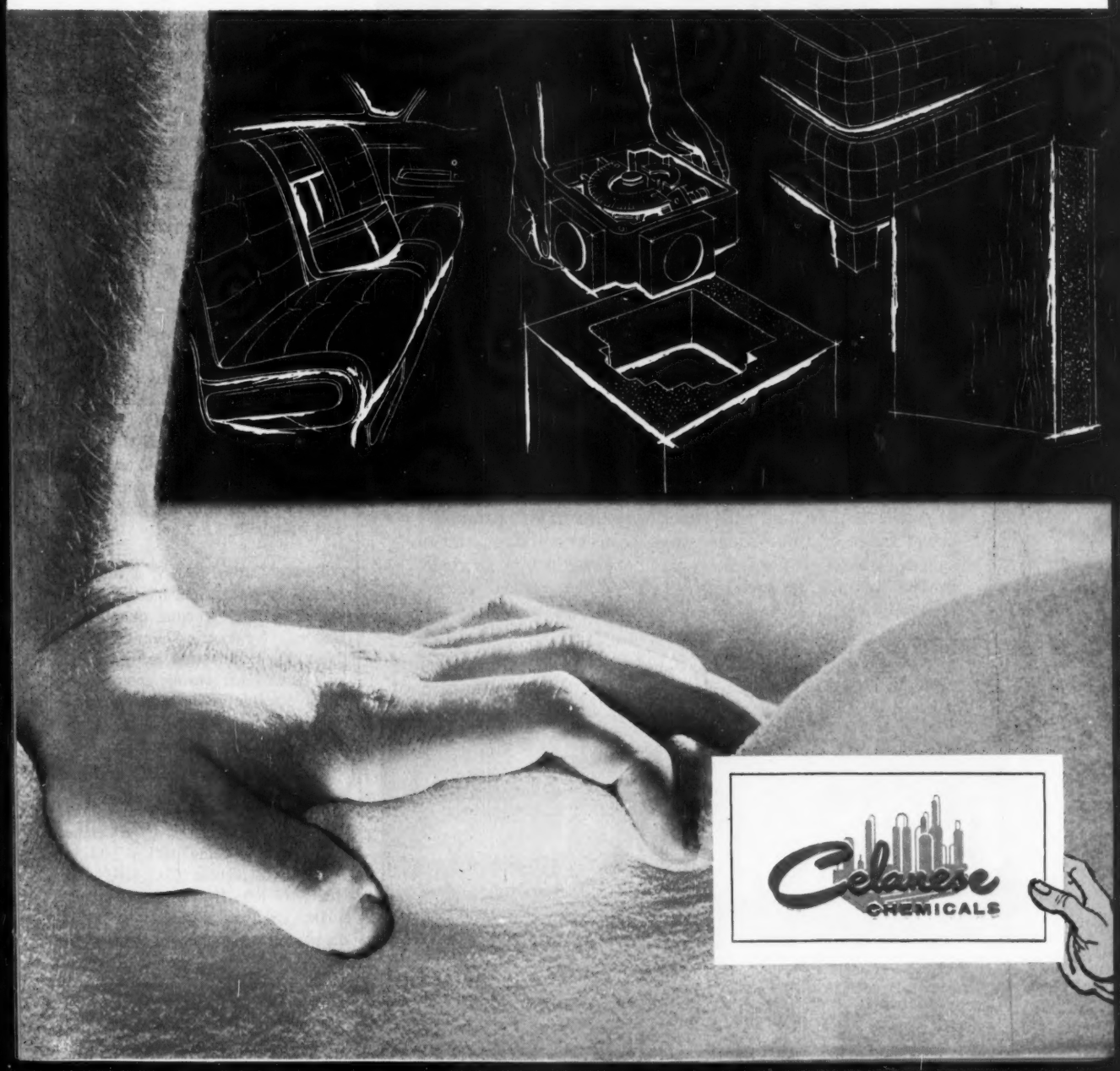

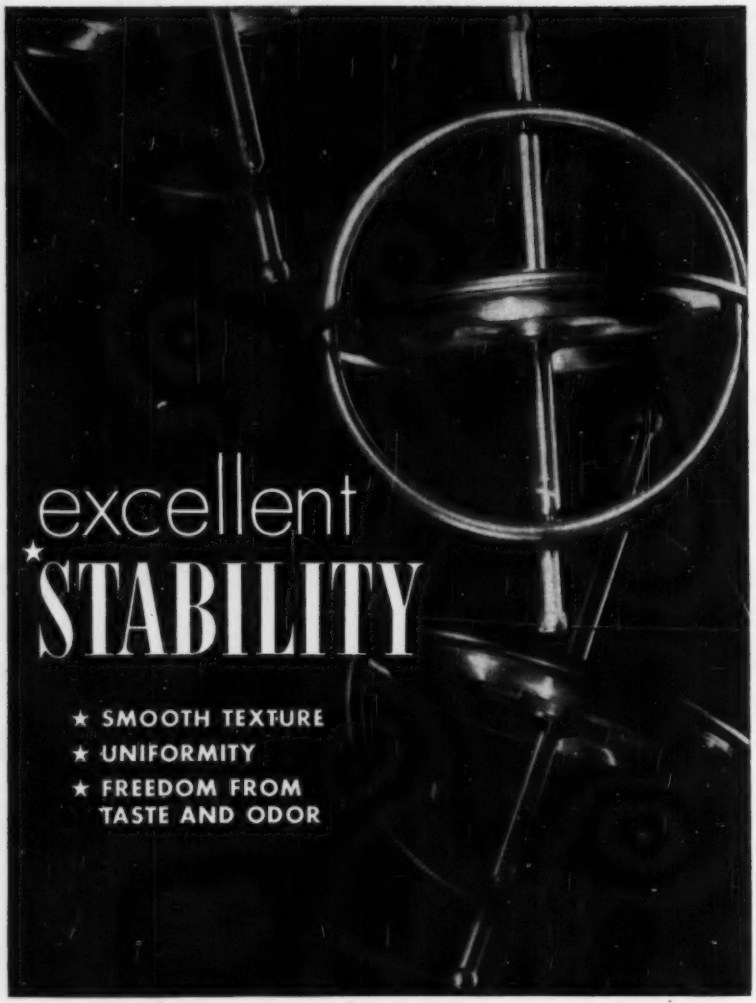

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SPECIALTIES

which eliminates alkaline precleaning; and Compound 56, an emulsion-type water wash made with higher alcohols in alkaline media.

•

Cooling Spray: A cutting oil in spray form has been developed by Crown Industrial Products (1005 Amsterdam St., Woodstock, Ill.). It's called Aerosol Jet Tapping and Cutting Oil, comes in 6- and 16-oz. cans.

•

Wet Sponge in a Bag: Ivers-Lee Co. (Newark, N.J.) has developed a method of sealing fully saturated sponges inside a flexible film envelope. The unit is suggested as a handy way to package cleansing creams for cosmetic kits, spot-removing fluids, white shoe polish for touchups, shortenings for greasing cake pans and scouring cleansers. The sponges can be packaged in either foil or transparent film.

•

Grit Getter: Enthol 230, a liquid detergent designed to remove buffing compounds rapidly and economically is the newest product of Enthone Inc. (New Haven, Conn.). Two to four gallons of the concentrate are used to make up 100 gal. of ready-to-use cleaning solution.

•

Deodorized Coolant: A coolant concentrate for abrasive-cutting machines, formulated with a deodorant, is now offered by Allison-Campbell, division of American Chain & Cable Co. (Bridgeport, Conn.). It's tradenamed Campbellene Cool-Blue Coolant, is sold in 1-, 5-, 14- and 55-gal. containers. One part of concentrate is used to 150 parts of water. Per gallon cost of mix is 1.7-2.6¢.

•

Epoxy Curer: Beta-S, a liquid dicarboxylic anhydride, has been introduced in developmental quantities by Heyden Newport Chemical Corp. (New York). It's said to be particularly useful for curing epoxy resins. Other possible applications: as an intermediate for preparing surfactants, lubricant additives, corrosion inhibitors, dyes, fungicides and inks.

•

Surface Sterilant: Beta-propiolactone, manufactured by Celanese Corp., is now being packed and sold by Wilmot Castle Co. (1931 East Henrietta Rd., Rochester, N.Y.) as a surface sterilizer. Wilmont also sells the dispensing equipment for the sterilizer.

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U.S.I. CHEMICAL NEWS

Mar. 21 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1959

World's Largest Industry-Owned Research Reactor Opens at Plainsboro, N. J.

U.S.I. One of Ten Participants

On January 19, Industrial Research Laboratories, Inc. (I.R.L.) — the world's largest nuclear reactor financed entirely by private funds and devoted solely to industrial research — made its formal bow at Plainsboro, N. J. U.S.I. and nine other companies are participating in the venture, using the reactor as a tool for basic and applied studies in many fields.

The fields of interest of the participants include alcohol, chemicals, special metals, plastics, tobacco, machine tools, explosives, packaging, glass, lead, electronics, oil and rubber. This wide range of interests will make I.R.L. a major contributor to the "Atoms for Peace" program.

The five-million-watt "swimming pool" type reactor is housed in an 87-foot-high, aluminum-sheathed "beehive" of reinforced concrete. It

MORE

Methionine Bibliography Now Available from U.S.I.

Readers of the November U.S.I. Chemical News have expressed tremendous interest in the lead story on methionine absorption through the skin. Hundreds of letters, telegrams and phone calls have been received asking for more complete information. To answer these many requests, we have prepared a selected bibliography of published articles on the oral and topical applications of methionine, which should prove very helpful to interested parties.

This bibliography is now available on request.

Have You a New Product To Tell the World About?

Make it routine to send your publicity releases on new products and developments to the Editor of U.S.I. Chemical News, often called the "Front Page of the Chemical Process Industries." The issue you are reading right now will be printed in over 250,000 copies of the leading publications serving the chemical and related fields. The Technical Developments column alone will probably produce over 600 inquiries, judging from the past average. You incur no charges or obligations by sending us your new product releases. The material will be judged and used solely on the basis of newsworthiness and space limitations. And of course we cannot guarantee that your item will definitely appear because of these considerations.

U.S.I. Reopens Second Chlorine-Caustic Unit At Huntsville, Alabama

Plant Ideally Located to Supply Growing Needs of Southern Textile and Pulp and Paper Industries

U.S.I. increased chlorine and caustic soda output at Huntsville, Alabama recently, when a second unit was put back into operation. U.S.I. has been producing at this location since 1952. The Huntsville plant site offers the benefits of economic freight rates to a large number of users, and is therefore an ideal location from which to supply the chlor-alkali requirements of Southern textile and pulp and paper operations.

Liquid chlorine is available to users in 30-ton and 55-ton tankcars. The future possibility of barge shipments is being studied. Commercial grade, 50% liquid caustic soda is available in 8,000- and 10,000-gallon insulated and lined tankcars as well as in barges.

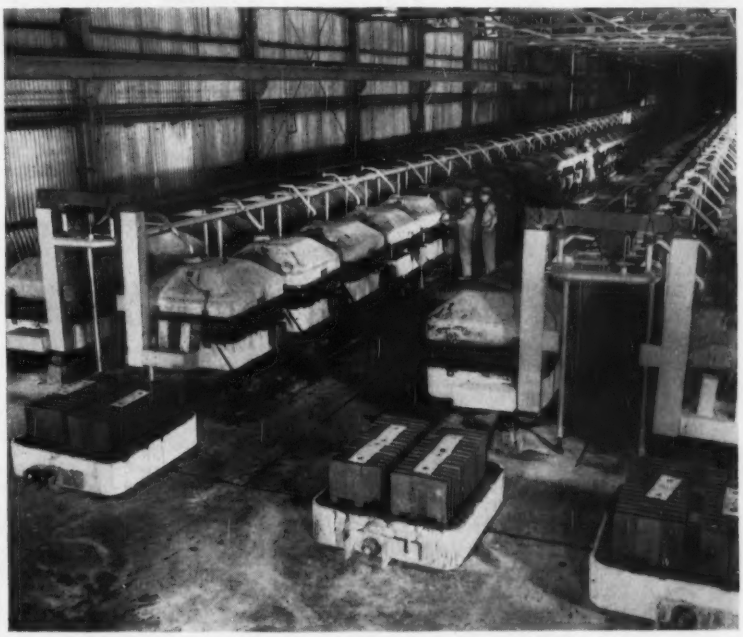
Both chlorine and caustic soda — products of the electrolytic decomposition of brine — are among the top dozen industrial inorganic chemicals produced in the United States today, in terms of tonnage. In 1957, the most recent year for which U.S. Department of Commerce figures have been reported, 3.9 million short tons of chlorine were marketed, and 4.0 million short tons of caustic soda, on a 100% NaOH basis, were sold.

MORE

Colognes Estimated Sixth In Aerosol Sales in 1958

Early estimates indicate that aerosol cologne sales for 1958 stand at over 26 million units. This would be an increase of about 50% over the 1957 sales figure of 18 million units. U.S.I. reports that the rise in its sales of anhydrous alcohol from 1957 to 1958 for aerosol cologne applications supports this estimate. Industry spokesmen reveal that 1958 was the first year in which aerosols accounted for over half the cologne market, in terms of dollar volume.

In 1958, as in 1957, colognes will probably rank sixth in unit sales among aerosol products, when all figures have been tabulated. The 1958 sales volume ranking should look much as it did in 1957, with hair sprays, shaving lathers, room deodorants, insect sprays and coatings taking the first five places.



Cell room of chlorine-caustic soda unit, U.S.I. plant, Huntsville, Alabama.

Mar. 21 ★ **U.S.I. CHEMICAL NEWS** ★ 1959

CONTINUED

Chlorine & Caustic

Chlorine End-Use Pattern by Industry

INDUSTRY	PERCENT OF TOTAL
Pulp and Paper	15.0
Chlorinated Solvents	13.0
Automotive Fluids	11.0
Plastics and Resins	11.0
Insecticides and Herbicides	7.5
Refrigerants and Propellants	5.0
Water and Sewage	3.5
All Others	34.0
TOTAL	100.0

Caustic Soda End-Use Pattern (Estimated)

END-USE	PERCENT OF TOTAL
Chemicals	26.9
Rayon and Film	17.8
Pulp and Paper	6.6
Export	5.8
Petroleum Refining	5.5
Lye and Cleansers	4.1
Textiles	3.5
Soap	2.1
All Others	27.7
TOTAL	100.0

Organic Derivative of Hypochlorous Acid Being Tested in Cancer Surgery

Surgeons are testing an organic derivative of hypochlorous acid — a form of monoxychlorosene — as a wash for cleaning cancer wounds after operating. Used in this manner, the material has been successful in halting the growth of cancer cell seedings in rats after cancers had been removed surgically. The chemical is not a cancer cure however.

The material is being employed widely in cancer operations on humans at the present time. Thus far the usual post-operative tests via supravital staining techniques reveal that all cancer cell seedings remaining in and around the wounds are destroyed by the wash.

The hypochlorous acid raw material for this compound is unstable and not available commercially. It must be prepared by the reaction of chlorine with water.

CONTINUED

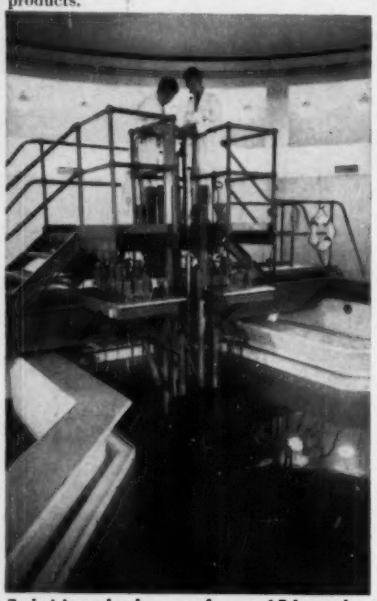
Reactor

is producing its chain reaction under 37 feet of demineralized water which serves as moderator, coolant and shield. The unit provides a source of neutrons, gamma rays and radioactive isotopes for study.

A permanent staff of 30-40 scientists and technicians is operating the reactor. In addition, participating companies maintain permanent staffs in individual research laboratories.

U.S.I. Studying Processes, Products

U.S.I.'s participation in this new undertaking is one more step in its expanding research program. Basically, its investigation will cover nuclear radiation for initiating or modifying chemical reactions, for controlling production processes, and for developing and testing new products.



Technicians load core of new I.R.I. nuclear reactor with fuel elements preparatory to start of operation. Core is 37 feet below surface of water which acts as coolant, shield.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Sodium and potassium borohydride information is presented in 34-page manual now available. Properties, reactions, handling are discussed. Thirteen tables cover technical data collected from other published works. **No. 1450**

The 1958 edition of "Annual Review of Biochemistry" can now be purchased. It is a 775-page volume, containing 22 sections by different authors, covering developments in all biochemical fields. **No. 1451**

Heat transfer coefficients in small sodium heat exchangers are discussed in a reprint now available. Empirical equations are developed for calculating the over-all heat transfer coefficients for tube and annulus exchangers. **No. 1452**

Molybdenum hexacarbonyl is now available commercially for use as a chemical intermediate, catalyst and vapor phase deposition raw material. Compound and derivatives are under study for dyes, toners, lube additives, etc. **No. 1453**

Rotating-cylinder viscometer, designed for measurement of liquids at very low shear stresses, is now on market. Claimed to be particularly useful for accurate studies of high-molecular-weight polymers. **No. 1454**

New aluminum soap has been developed to gel solvents without use of heat. Bulletin now offered on product tells how to form stable gels from non-polar solvents and mixes of polar and non-polar solvents. **No. 1455**

Automatic, lab-bench zone refiner just developed will give high-purity organic reagents from run-of-bottle chemicals. Said to purify any material with 50-300°C M.P. Greatest use seen for organics hard to refine by usual means. **No. 1456**

Butene-1 can now be obtained with liquid vol. analysis of 98.5% butene-1, 0.0% isobutylene and butadiene, 0.8% n-butane, 0.7% butene-2. Butene-2 now obtainable with 95.0% butene-2, 0.5% butene-1, 1.0% butadiene, 3.5% n-butane. **No. 1457**

Standard fuel elements in 4 types, for use in low-power research reactors, now on market. Availability of standard elements claimed to greatly reduce costs of custom design, special tooling and set-up, special engineering. **No. 1458**

Methyl borate is now available commercially in carload quantity. Material is a widely-miscible, non-aqueous solvent, azeotroping agent, Lewis-acid catalyst and intermediate. Also acts as a neutron absorber and detector. **No. 1459**

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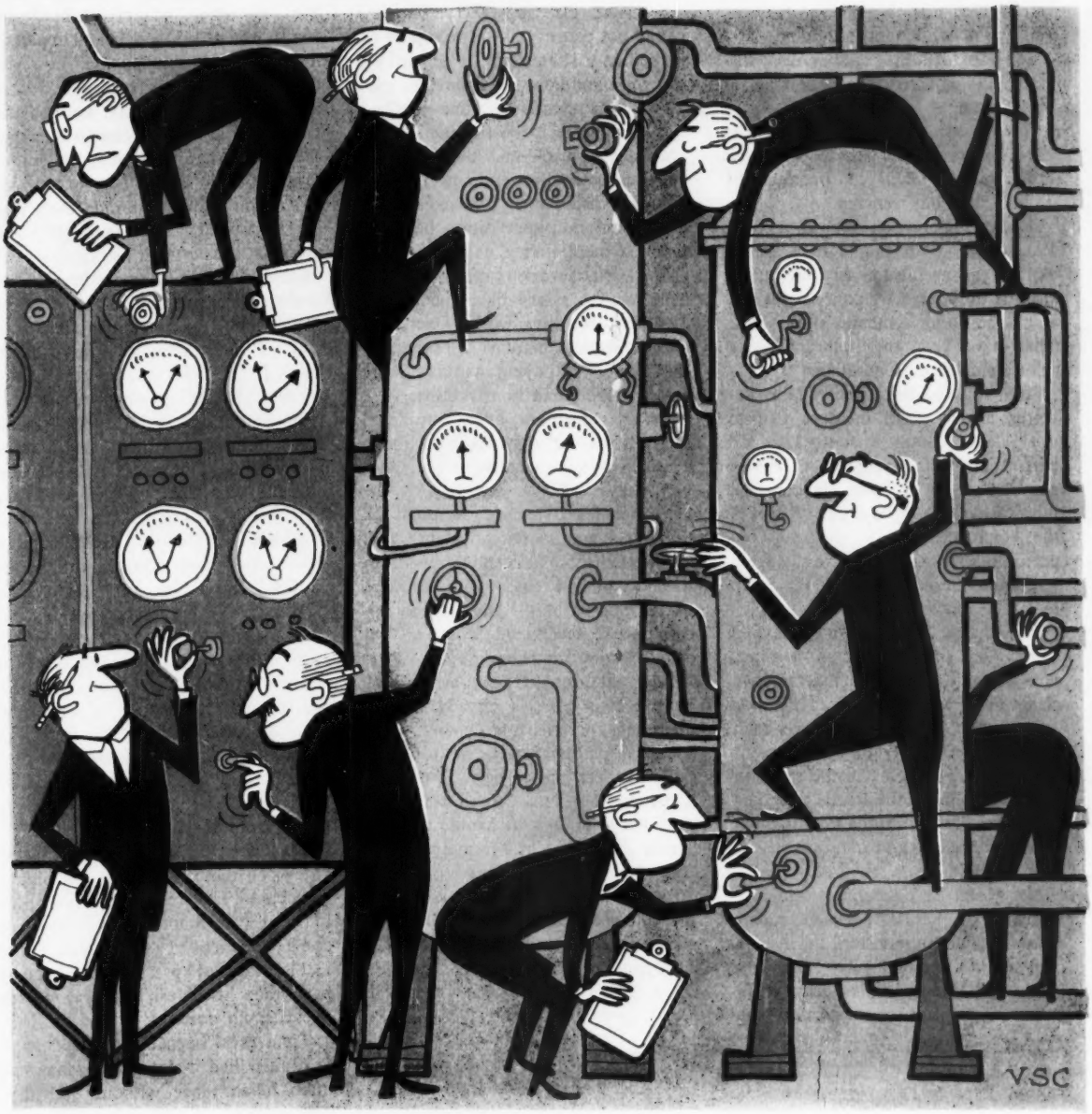

Every plant operator is multiskilled, salaried, and has supervisory responsibility in Sarnia plan.

Individuality: An Answer to Automation

The plant operating principles cartooned above are part of a plan developed to meet the challenge of automation and its effects on individual workers—a growing problem of chemical companies. And, although the complete plan is too radical for use in this country, a check of U.S. chemical plants this week shows how parts of it are being used effectively.

It is called the Sarnia plan because it was developed specifically to fit Sun Oil's small, highly automated Canadian refinery at Sarnia, Ont. The aim was to organize a staff that could operate the refinery competitively with larger refineries. The plan has four basic points, each designed to improve the worker's productivity and opportunities by considering his individuality and his ability to meet mental challenges greater than those often met in average industrial jobs:

(1) The men were selected on the basis of intelligence, vision, initiative, rather than refinery experience.

(2) Each member of the operating

department is on salary, rather than hourly payroll.

(3) No line is drawn between supervision and nonsupervision.

(4) Job titles that convey class distinction (e.g., foreman, helper, trainee) aren't used.

Teamwork, Rewards, Dignity: The Sarnia plan enabled Sun to train shift crews of 10 men to operate the 15,000-bbls./day refinery.

Each shift crew operates as a team. Each member of the team is multiskilled, can perform nearly any operation, is unfettered by concern that he might be doing someone else's work. Aim is to keep the refinery, rather than a single unit, operating.

The multiskilled individual's rewards are in great measure tied to the salary payroll system. Top job performance and length of service can win salary increases. In contrast, most hourly pay systems "freeze" the employee's salary; the only opportunities for increases result from wage-rate increases, or from a jump in job classification.

The Sarnia operators also have a dignity not often found in a plant, as a result of job titles that remove class distinction (*see box below*). And, Sun points out that since each member of the operating department supervises a large part of the refinery, each could be considered a supervisor—that's why no line is drawn between supervision and nonsupervision, as in most plants.

Not Here: By deliberately avoiding a sharp distinction between supervision and nonsupervision, the Sarnia plan almost immediately loses any chance of being used as an over-all pattern for plant operations in the U.S. Clarence Thayer, Sun Oil's vice-president in charge of manufacturing, says: "In the U.S., the law would not permit this—it would be regarded as a subterfuge to get around the wage-and-hour requirements, particularly as regards overtime pay."

This appears to be the main strike against the plan—and one that can be overcome. By retaining the traditional distinction between supervision and nonsupervision, the overtime payment policy can be strictly defined. Plant workers can receive the benefits of a salary plan and still be paid for overtime work. One West Coast chemical plant is operating on this principle, paying workers on a salary rather than hourly basis.

Other companies have considered salary plans, but they don't say much about it. A top executive at one company says: "We've toyed with the idea, but it's dynamite. It might be done at a new, nonunion plant. And, we've also thought it might work in certain isolated cases with workers having special skills. But psychologically, we're several years away from even drawing up plans."

A Breakthrough: But one part of Sun's Sarnia plan is already regular operating practice at many U.S. chemical plants. Single-craft or one-skill barriers have been breached. Some small plants, like Sun's, have expected operators to handle a number of different jobs for many years.

In fact, some plants go one step further. Their operators assist in general maintenance, whereas Sun's maintenance is handled on contract by Catalytic Construction (*CW, Aug. 3, '57, p. 52*). Unlike refineries, chemical plants generally do not face sudden pressures of maintenance caused by refinery "turnaround" (refiners' term for periodic, planned shutdowns for thorough inspection and repairs). The situation is changing, however, as automated processes replace non-automated ones. Already, maintenance engineers at many chemical plants talk of turnarounds with as much urgency as do the refinery executives.

And, in the process industries, it is in the maintenance area where the greatest break with single-craft or single-skill tradition has come. Maintenance departments at many plants now operate in a manner similar to that of Sun's operating department. Instead of single-craft mechanics roaming plants to perform parts of jobs requiring their special skill, mechanics with a number of skills patrol one plant area and perform all or most of the tasks needed to do the complete maintenance job.

Efficiency Gainer: Most of the plants that have adopted the multiskilled setup report improvements in efficiency. Yet, to overcome natural resistance to such a change is, in some respects, more difficult in maintenance than in operations. The Sarnia plan tends to give operating men a certain dignity through the ability to perform many tasks, be part of a team. But in maintenance, a mechanic feels that his dignity derives partly from his single-craft ability.

Says one Midwest plant manager. "Most of these craftsmen are highly respected. They're looked upon almost as consultants. When they become multiskilled mechanics, they feel a loss of prestige. A general handyman just doesn't get the respect a craftsman does."

Time for Change: But the change to multiskilled maintenance plans has often taken place without difficulty. The method of installation offers a pattern for introducing multiskilled operator setups. The companies gave something to win over both employees and unions. Often, management's concession has been to give first-class status and pay to multiskilled men.

Whether organization changes in operations will take their cue from the Sarnia plan and multiskilled maintenance practices remains to be seen. But it's certain that changes being brought about through automation will require changes in the approach to the operating organization.

Dignity: Dividend for Plant Operators

How Sun gets it through the Sarnia plan

"In the Sarnia plan, we seek to recognize the dignity of man. We coined a completely new set of job titles. There are no 'second class' or 'third class' or 'fourth class' people. There are no 'helpers' and no 'assistants.' There are no 'trainees' and no 'janitors' and for that matter no 'foremen.' Since the employees at Sarnia have a wider scope of responsibility, the new titles they carry are not just empty words: and we believe the titles have some importance to the men—although probably not as much as the salary rate itself or the merit increase system."

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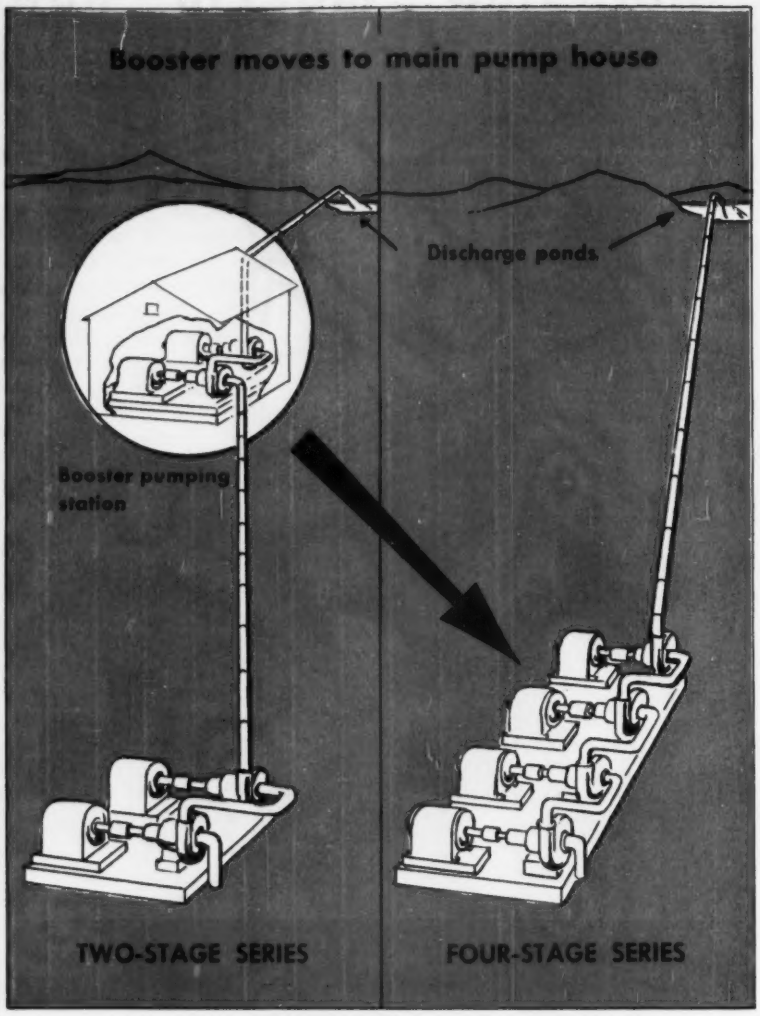


Cost-Cutting Setup for You?

The drawing above shows how the Rio Tinto Mining Co. of Canada bypassed conventional booster-station pumping for disposal of uranium tailings at its Milliken Lake mine in Ontario's Elliot Lake area. The four-stage system could well find application in plants that pump abrasive, high-solids slurries.

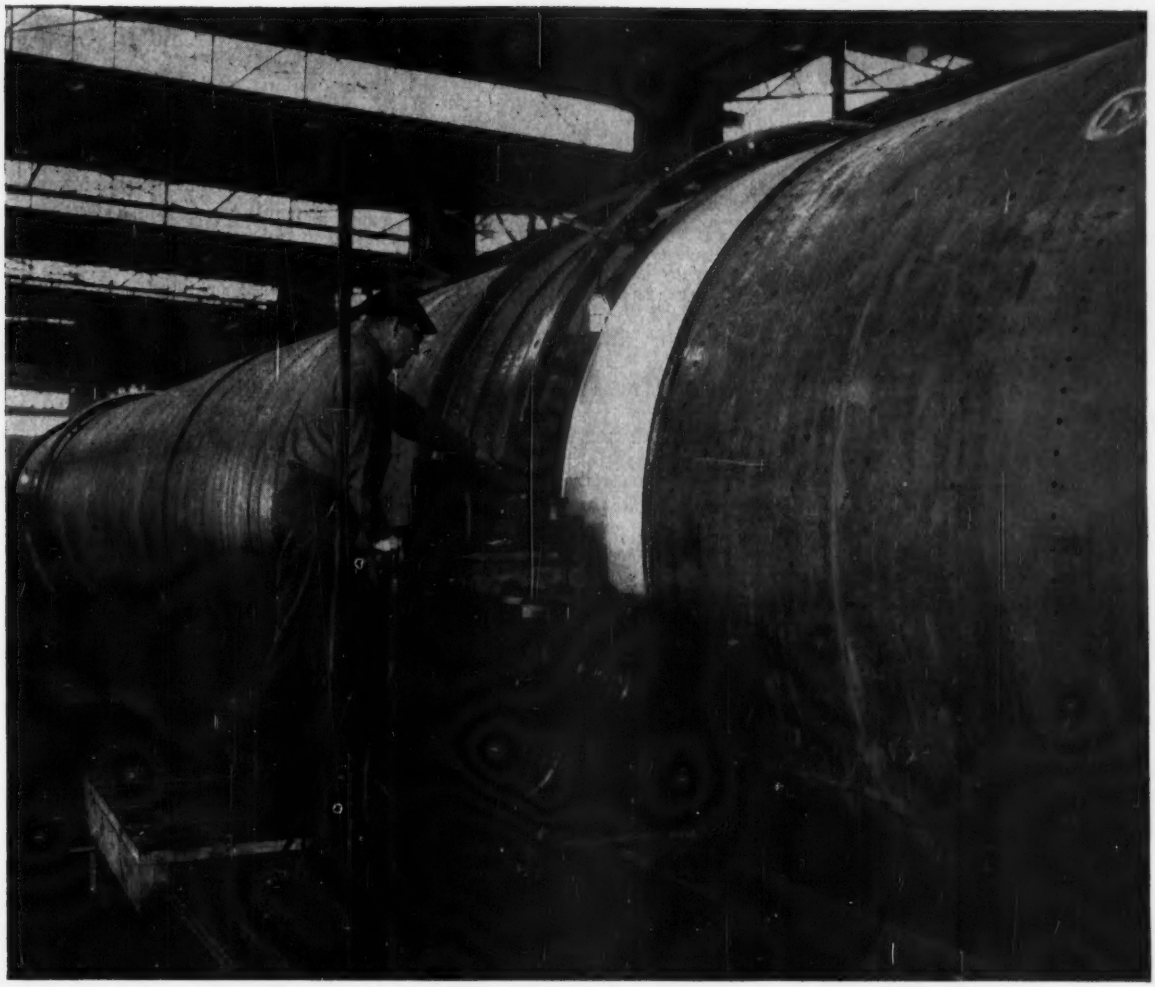
Rio Tinto's installation has saved more than $100,000, will round out its first year of trouble-free operation next month. During that time, over 2.5 million tons of 32%-solids pulp have been pumped at flow rates of 1,100-1,700 gpm. through 7,000 ft. of line against a 475-ft. head.

Key to the project's success: the specially designed centrifugal pumps. Ironically, the four-stage-pumping idea was almost scuttled at the outset because many pump manufacturers were reluctant to take on the special designing job.

Rio Tinto engineers favored four-stage pumping over the booster-station because of the higher cost of building two pump houses, providing water and electric power for the remote station. An access road, built over rough terrain, would have required winter maintenance; the remote station would have required staffing.

The pump division of Canadian Allis-Chalmers turned the trick, modified its SRL-C pump to fit the job.

Solving the Problems: A nodular iron casing, rated at 260-psi. working



Louisville Dryer—10 feet in diameter, 10 stories long!

Turn a ten story building on its side, and there'd be room to spare on either end of this huge pit lathe at Sharon, Pennsylvania where this 10′ x 110′ Louisville Dryer was fabricated.

This lathe is used for machining the reinforcing bands onto which are mounted the forged steel tires. This careful workmanship assures concentricity of the completed dryer shell—a primary factor in efficient seal operation.

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Initial Discoloration	15 min.
Maximum Discoloration	90 min.

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Water	0.21 %
1% Soap	3.45 %
Mineral Oil	2.10 %

migration

Lacquer, 25°C., 14 days	Very slight softening
Varnish, 25°C., 14 days	No effect
Polystyrene, 60°C., 19 days	No effect

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pressure, and specially ribbed in high-stress areas, was designed to withstand the high pressures developed in the last pumping stages. A special stuffing-box design reduces high pressures on the pump glands and packing exerted by the abrasive pulp to less than 100 psi., permits the use of normal pump packing.

To reduce the erosive effect of the pulp, pump-impeller tip speeds were limited to 5,000 ft./minute and stellite was used in some pump parts (i.e., shaft sleeve, water-seal bushing, labyrinth ring).

The electrical system was set up for time-delay-sequence starting to prevent any pump from starting before it was filled with pulp, which would cause surging, starvation and impeller locks. Pressure switches, interlocked with the starters, prevent starting unless gland water is at the proper pressure in all pumps.

When the pumps are shut down, or tripped by any protective device, the pulp in the line is automatically (by an air-operated valve) dumped to a local reservoir. A rubber-lined check valve protects the pumps from backflow. The pumps are flushed with clean water.

The first 1,000 ft. of line to the tailings discharge pond is rubber-lined to reduce wear. The next 6,000 ft. is of unlined Schedule 40 steel pipe; the last 2,000 ft. of gravity-flow line is of wood stave. Steel pipe was required because of the bursting limitations on wood stave. But Rio Tinto also found that the higher cost of steel pipe was offset by savings in time and labor required to install the pipe over rough terrain. Wear on the steel pipe has been low: less than 0.007 in. in test sections after passage of over 2 million tons of pulp.

During initial startup, the pumps ran for less than 10 minutes, when two of them seized. Four other seizures occurred within a few days. Cause was laid to shaft deflection; a softer grade of stellite for the shaft sleeves has taken up shaft deflections by wear, preventing further seizures.

Operating difficulties were eliminated in the first few days of operation, and Rio Tinto reports that maintenance problems have been less than with conventional installations—reasons why, in addition to the initial savings, it is convinced the special pump design has paid off.

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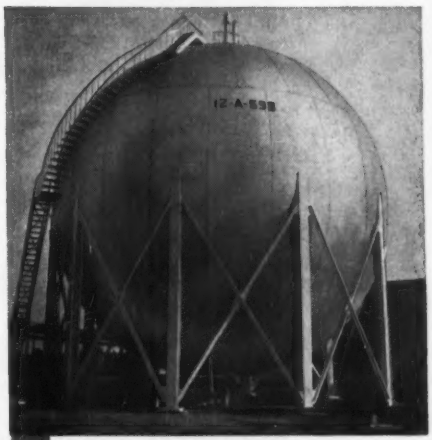
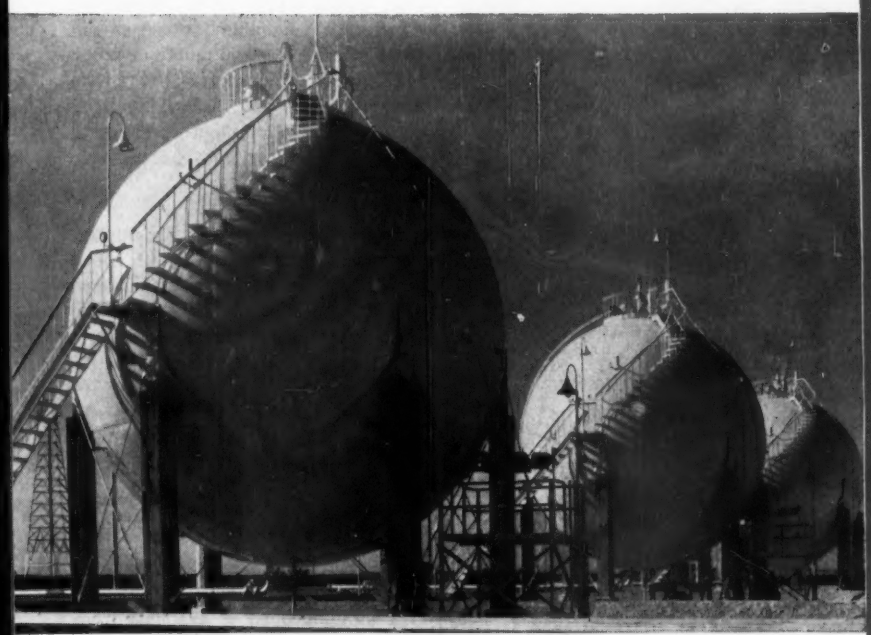
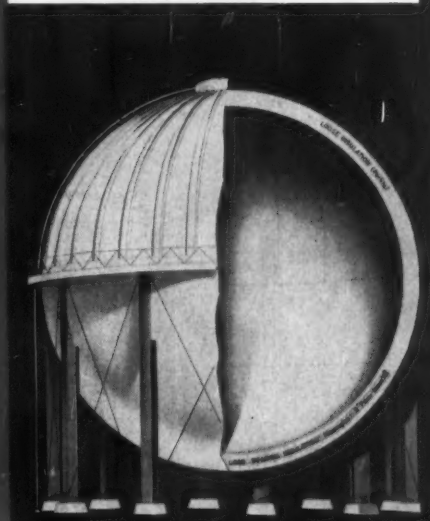
Ammonia. 64 ft dia, 55 lb working pressure



Isobutane. 50 ft 6 in. dia, 60 lb working pressure



Gasoline. Three 2500 bbl spheres, 30 ft dia, 20 lb working pressure



Liquefied chlorine. Cutaway view of insulated storage sphere

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PRODUCTION EQUIPMENT

Flowmeters: Two new devices are being offered in the flowmeter field: Cox Instruments Division of George L. Nankervis Co. (15400 Fullerton Ave., Detroit 27) is out with Type 20 turbine flowmeters for measuring liquid flows at pressures to 5,000 psi. and temperatures from —455 to 1,000 F. Accuracy of ±½% and pressure drop of less than 5 psi. are claimed by Cox. Sizes cover the 0.25 to 250-gpm. range.

Brooks Rotameter Co. (P.O. Box 432, Lansdale, Pa.) has developed the MPT-53 Flow Integrator, with a scale for flow rate, and a six-digit counter for totals. Unit's operation depends on a photoelectric cell to translate the vertical motion of a rotameter float into a rotary motion for the indicators. The unit is available with card- or tape-printing counters, and predetermining counters for automatic batch control.

•

Electric Furnace: A small, multipurpose electric furnace is now being offered by Thermo Electric Mfg. Co. (509 Huff St., Dubuque, Ia.). The unit, called Type 2100 Thermolyne furnace, is adaptable for use as salt bath, melting, vertical muffle or crucible furnace. Chamber is 6⅝ in. in diameter, 11½ deep. Maximum temperature for intermittent operation is 1900 F. Price (without accessories): $180.

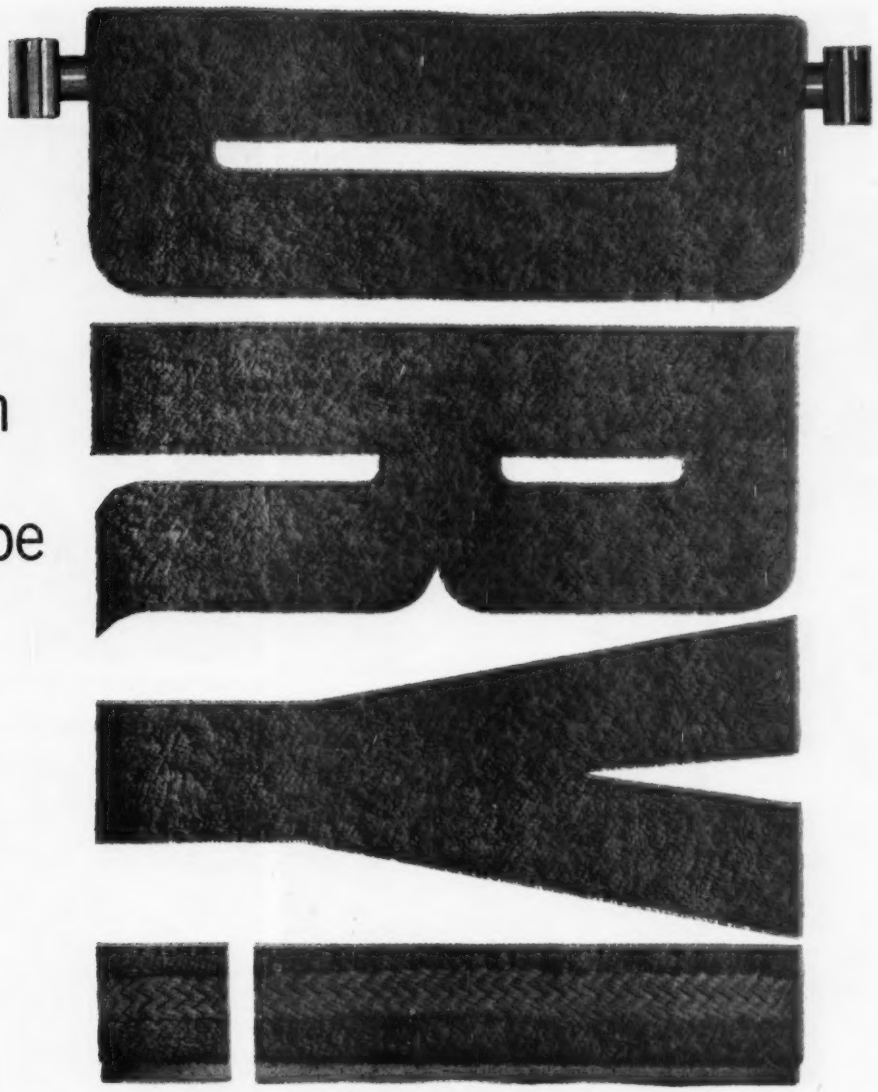
•

Rubber-Lined Pumps: Carl Buck & Associates (Essex Fells, N.J.) has a new line of Camac rubber-lined pumps for handling all alkalis and acids (except nitric and chromic acids). The three pumps (Numbers 166, 6T and 310) range in capacity from 10-1,200 gpm. at heads from 15-120 ft., in power from ½-20 hp. The rubber lining is suitable for temperatures up to 210 F. Any other synthetic rubber or plastic lining can be provided.

•

Air Monitor: A new air monitor that detects alpha, beta and gamma rays simultaneously is available from Nuclear Measurements Corp. (2460 N. Arlington Ave., Indianapolis 18, Ind.). Called Model AM-2A, the detector also records the amount of radioactivity on a continuous chart and warns personnel when preset limits are exceeded.

DAVISON



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After lining and painting, drums get final check.

Reconditioners Gird for Drum Shortage

Because of shortages, many steel-drum reconditioners this week are easing up on solicitation of new business. Some are supplying customers on a priority basis; and a few have been forced to reject big, 25,000-50,000-drum orders. There's good reason, moreover, to believe that the shortage will worsen, that long-stable prices will move up a notch.

Immediate reason for the shortage is a spurt in demand for reconditioned drums. But reduced production of new drums during the recession also is a contributing factor. And the anticipated steel strike would markedly worsen the shortage if the strike were to last more than a month. Some reconditioners are urging customers to buy new drums now to ensure used-drum supplies in case of a strike. The replacement of standard 18-gauge drums with less-hardy 20-gauge drums may also reduce the supply of used drums.

The shortage is already causing some reconditioners to pay 25¢ more per drum, charge proportionately more for the finished product. And if a steel strike causes higher steel prices (hence, higher new-drum prices) some major drum processors say there will be a minimum price boost of 10%.

Another result of the shortage: more drum users are doing business on a service basis, rather than outright purchase and resale. (On a service basis, the filler keeps title to

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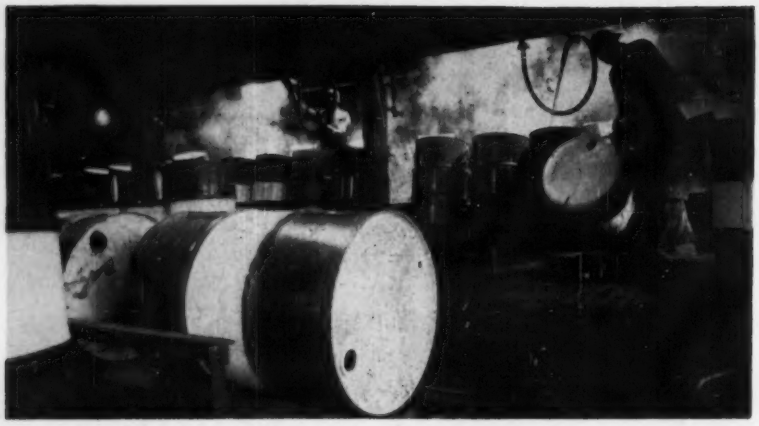

After caustic wash, tight-head drums will be rinsed with water.

the drums, has them reconditioned for a flat fee.)

Chemical Bite: Each year, chemical and paint and varnish companies take an estimated 45% of all 55-gal. drums reconditioned. Just how many is moot, however.

A '57 Census Bureau survey pegged reconditioned 18-gauge, 55-gal. drum production (both open- and tight-head types) at 22.5 million vs. 16.5 million for new drums. But informed industry sources, including Morris Hershon, president of the National Barrel and Drum Assn., believe production is around 40 million units. The same sources forecast '58 and '59 production (barring a steel strike) at about the same level.

Many reconditioners, they say, were extremely conservative in estimating daily production figures for the Census Bureau. And although the survey covered 150 captive and 250 independent plants, hundreds of other shops—handling upwards of a few hundred drums daily—were excluded.

Chemical industry use is divided into two major groups: (1) chemicals, solvents and adhesives take about 25% of total used-drum output: (2) paint and varnish makers account for 20%. The petroleum industry consumes about 35% and food packers about 15% of total production, with miscellaneous users taking up the remaining output.

Independent plants process almost four times as many drums (all types) as do captive plants. The '57 Census Bureau figures show that independent plants handled 6.5 million open-heads, 11.4 million tight-heads. For captive plants, the comparable figures were 0.6 million and 4.1 million. Independent reconditioners (with perhaps a certain ingrown optimism) report that captive plants are on the decline. Several large chemical firms, however, still maintain their own plants.

Biggest filling area is now the East Coast strip running from Baltimore through New York. The same area is also the biggest emptying area. Next is in the Midwest—Illinois, Michigan, Indiana and Ohio. There are indications, however, that the Midwest may become a much more important filling area. One large Eastern processor believes that the St. Lawrence Seaway will spur this trend by making eastward shipment of filled drums more economical.

Growth Problems: Drum processors are inclined to attribute the current shortage to rising demand. Some expect it will last at least until the fall, when most of this year's output of new drums will be available for reconditioning. But many processors are also concerned about the implications of the lightweight, 20-gauge drum.

There's wide agreement that the 20-gauger will endure fewer reconditionings than the 18-gauger. Many processors estimate three to four reconditionings as par for the light drum, against eight to 10 for the heavier containers. In unusual cases, 18-gauge drums are reconditioned 20 times and more. But the processors discount the MCA-Steel Shipping Container Institute tests (*CW, June 28, '58, p. 71*) that pegged reuse at five trips or more for 20-gauge drums.

Net effect of the claimed shorter service life of 20-gauge drums, some say, will be a reduction in the supply of reconditioned drums. Others, however, hold the lighter drums will demand commensurately greater drum production and, in the long run, will not affect availability of used drums. And some claim that the light drums will raise the trip cost about 5%.

Rising costs loom as another problem for reconditioners. How much reconditioned drums will rise in price, however, hinges on several factors. Most important: the advance in new-drum prices and changes in the price reconditioners must pay for second-hand drums. It's very likely that price increases in used drums will be largely offset by higher purchase prices. In the past 10 years, used-drum prices have advanced only 50¢/unit.

Drum prices depend largely on condition and customer requirements. In the Eastern area, No. 1 (top quality), 18-gauge, 55-gal. drums sell for up to $4.75 (tight-head) and $6 (open-head). Drums that do not meet No. 1 specifications sell for $1-2 less, are classed as No. 2 and No. 3 drums.

Reconditioning charges on service contracts also vary with requirements and condition, cost $1.50-2.25 for tight-heads, $3 for open-heads. Eastern reconditioners pay (on an f.o.b.-reconditioning plant basis) $3 or less for both types.

About 60% of used-drum output is No. 1 grade, about 30% No. 2 grade. Chemical and protective coating users mainly buy No. 1 and No. 2 grades. No. 2 grade is used chiefly for liquid asphalts, tallows and semirefined oils.

Chemical Customers: The drum reconditioning business consumes small but healthy quantities of protective coatings, abrasives and caustic soda. A 40-million-units/year output, for example, would call for some 25 million lbs. of caustic soda for cleaning tight-head drums.

Open-head drums are first burned out, given an abrasive blasting. This is followed by chime resealing and dedenting, cover blasting and rerolling and interior and exterior painting. Tight-head drum processing omits the burnout and interior abrasive blasting, uses instead a hot caustic soda wash, sometimes done with chain abrasion. Acid cleaning is sometimes used.

What's Needed: Drum reconditioners are especially in need of more

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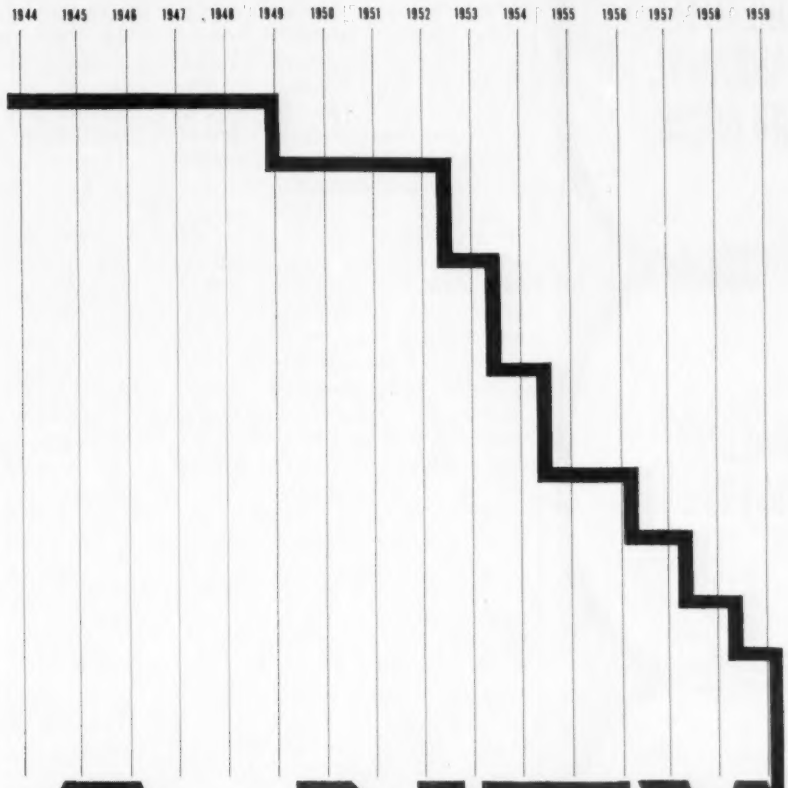

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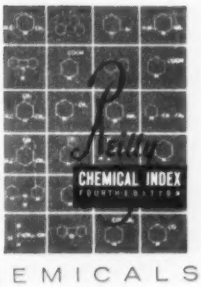

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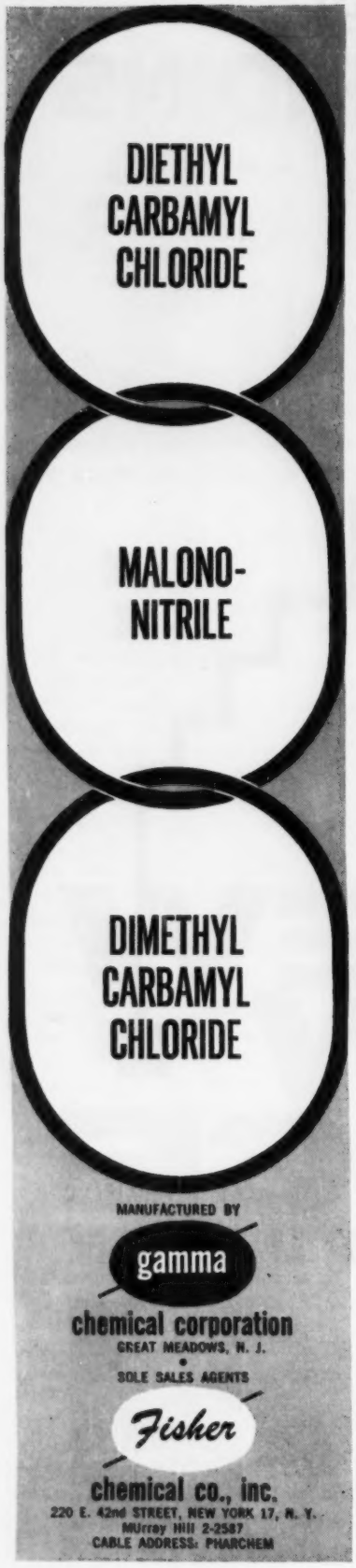

automation, machinery that would up production rates from 20 to 100 drums/day/man. Some, but not all, would like to see automatic drum lithography.

And there's a widespread need for more effective cleaning of tight-head drums. One large producer estimates it could afford to pay 10-12¢/lb. for a universal cleaner—twice its present charge for caustic soda. A chemical supplier is now researching a hydrochloric acid-sodium nitrite sequence process. Caustic, which works well with light oils and many chemicals, falls down when the drum has thick oil or viscous plastic residues. Ultrasonic cleaning, tried by some, hasn't yet proved completely satisfactory.

Better lining methods are also needed. Electrostatic painting with paint and drum oppositely charged is under research. Others hope drum pooling will ease collection.

Another need is an all-purpose drum, says Bayonne Barrel & Drum's energetic president, Frank Langella, inventor of much of the industry's present machinery, and head of the NBDA's research committee. Such a drum would have a head that could be crimped in place with a disposable gasket and ring to make, in effect, a drum equivalent to a tight-head.

In the processor's plant, the head could be removed by machinery to make the equivalent open-head drum for cleaning. This would permit more effective cleaning, dedenting and chime sealing and, most important, make protective lining possible. (Tight-head drums cannot now be effectively coated because of the small openings, ventilation problems.) Such a drum would go a long way toward meeting the chemical industry's standards for reconditioned drums: freedom from traces of residues trapped in the chime seal and left on the walls. And the linings could markedly broaden chemical applications. But whether new-drum producers would make such a container is problematical. It would largely remove one of the major sales advantages of new drums over used drums.

For the immediate future, reconditioning men will concentrate on cheaper and more effective processing. And they will cope as best they can with the fast-developing shortage, new competition from the cheaper, light-gauge drums.

Sealer on the Bag Line

Moisture-tight multiwall bag seals are again in the forefront of chemical packaging news. This week, Chase Bag (New York) is launching a new closure system, Moistite, that is claimed to moistureproof ends of flat-tube multiwalls. Potential use: in packaging hygroscopic products.

Chase's system employs a special machine that uses a polyethylene-based adhesive cord and a paper tape to make the seal. It's similar to a unit recently introduced by Hudson Pulp & Paper Co. (*CW, Jan. 13, p. 67*). Hudson's version, however, uses a polyethylene-coated paper tape.

Important advantages of the new unit, says Chase, are these:

(1) Seal is tight to end of the bag. In some sealers, claims Chase, multiwalls drop off the machine before the pressure apparatus can adjust to the paper thickness, thus causing an incomplete seal.

(2) High speed. The unit will operate at conveyor speeds 28 to 48 ft./minute.

(3) Scorching problems are eliminated. Preheating prevents burning of bag wall coatings and paper.

How It Works: In operation, an adhesive cord is pulled automatically onto a heated block, melted and then extruded onto paper tape. The tape is then folded into a V-shape and sealed over the stitching by pressure rolls. The folder, says Chase, is the key to the operation. The company redesigned existing folders to reduce length from 12 to 3 in. This prevents the adhesive from setting up too quickly, yet keeps it at a temperature low enough to prevent scorching.

Closure costs of the Moistite unit are almost identical, says Chase, with those of its projected major competitor, Hudson's Moisture Vapor Transmission sealer. But substantial closure cost advantages (4-8¢/1,000 seam inches) are claimed, when the unit is compared with other types of "tape-over-stitching" bag closures.

At the moment, Chase is not planning to lease the Moistite unit, but will sell it outright for about $3,500. Hudson, however, both leases and sells (price: about $4,000). Both price and the speed with which bag companies are introducing new sealers point to wide-open competition for the chemical packaging market.

ACETYLENE FROM NATURAL GAS OR NAPHTHA

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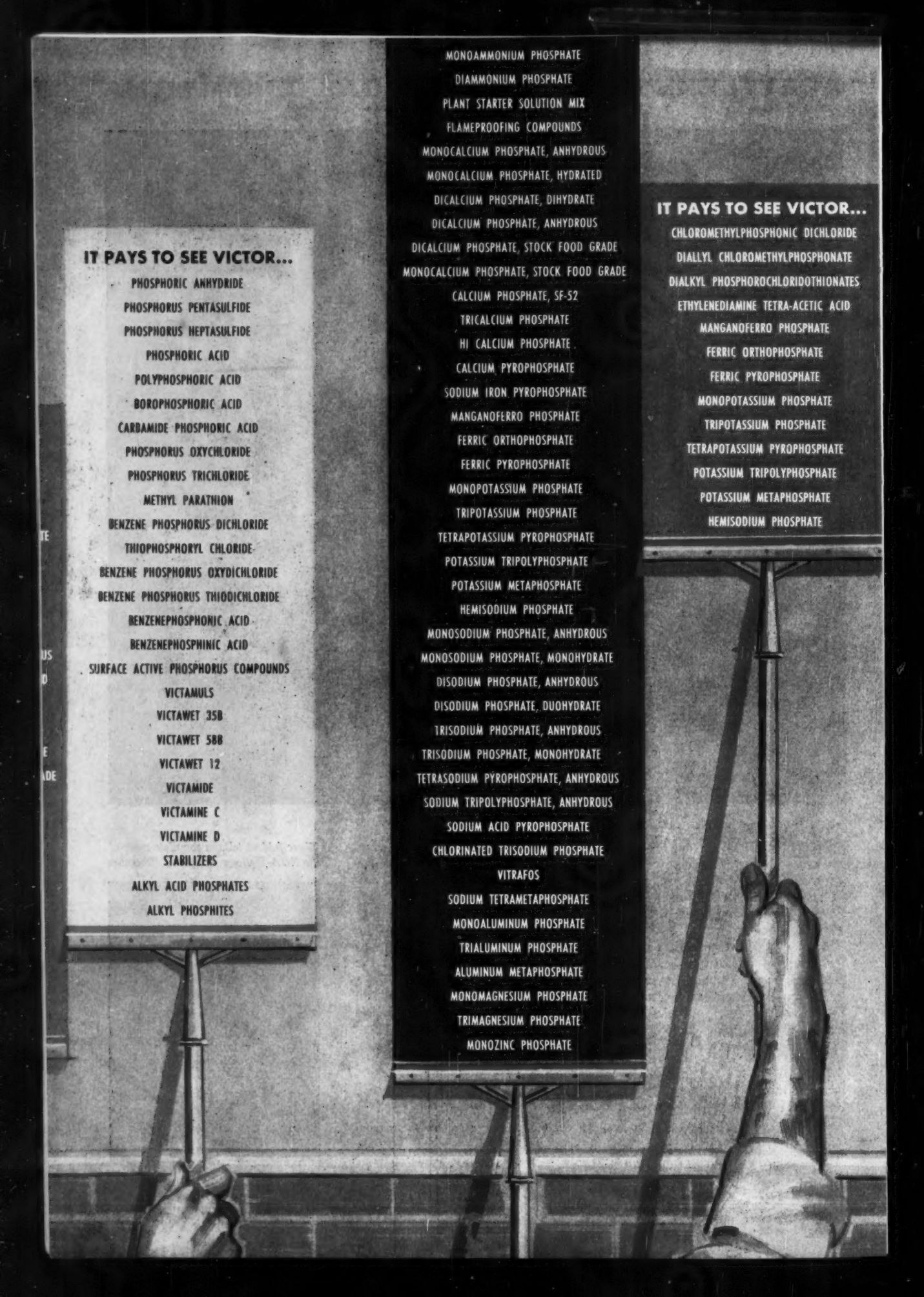
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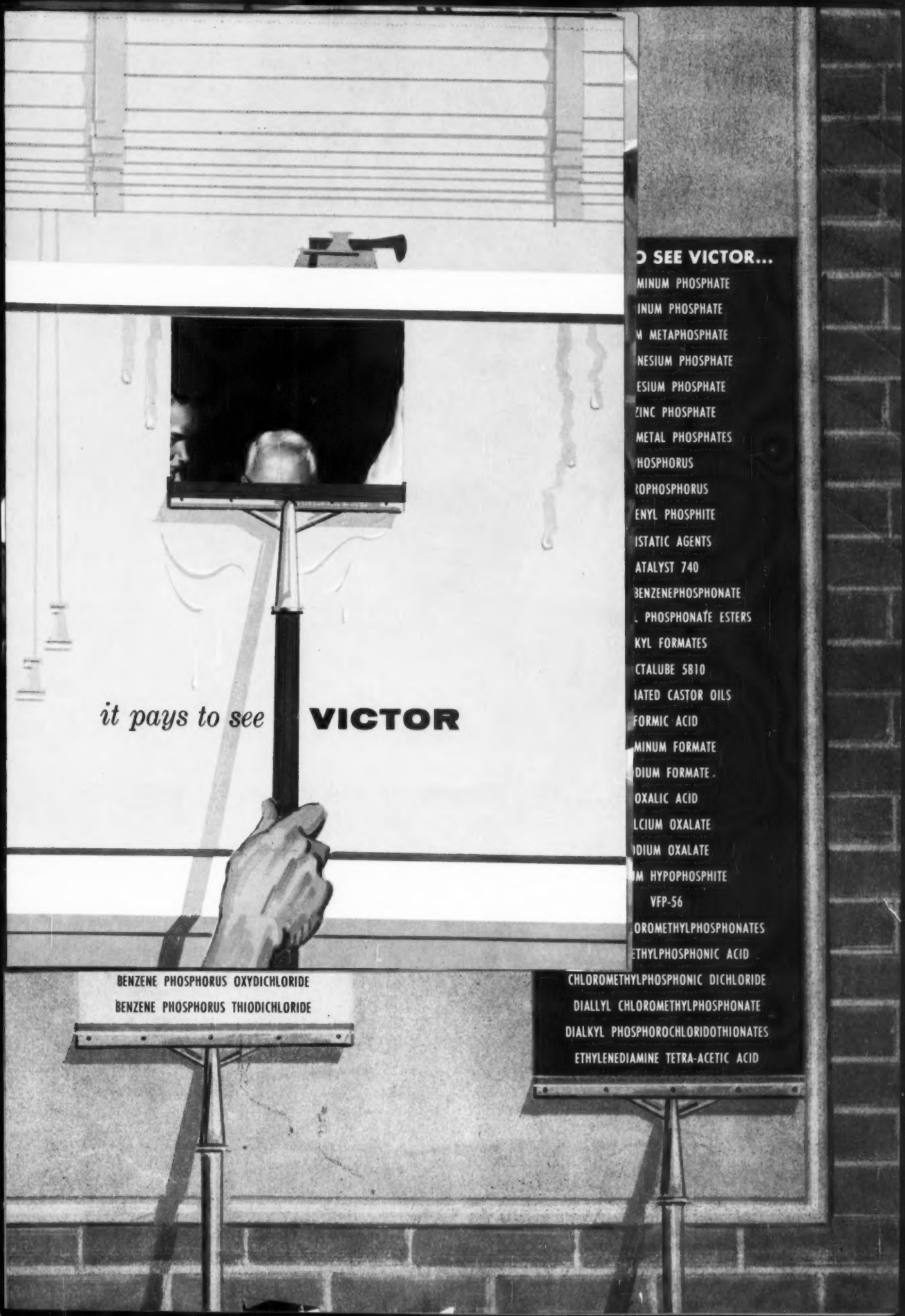
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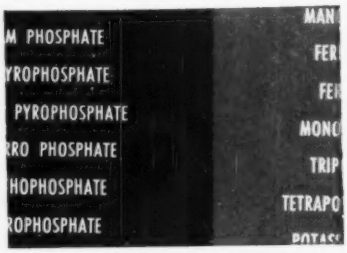

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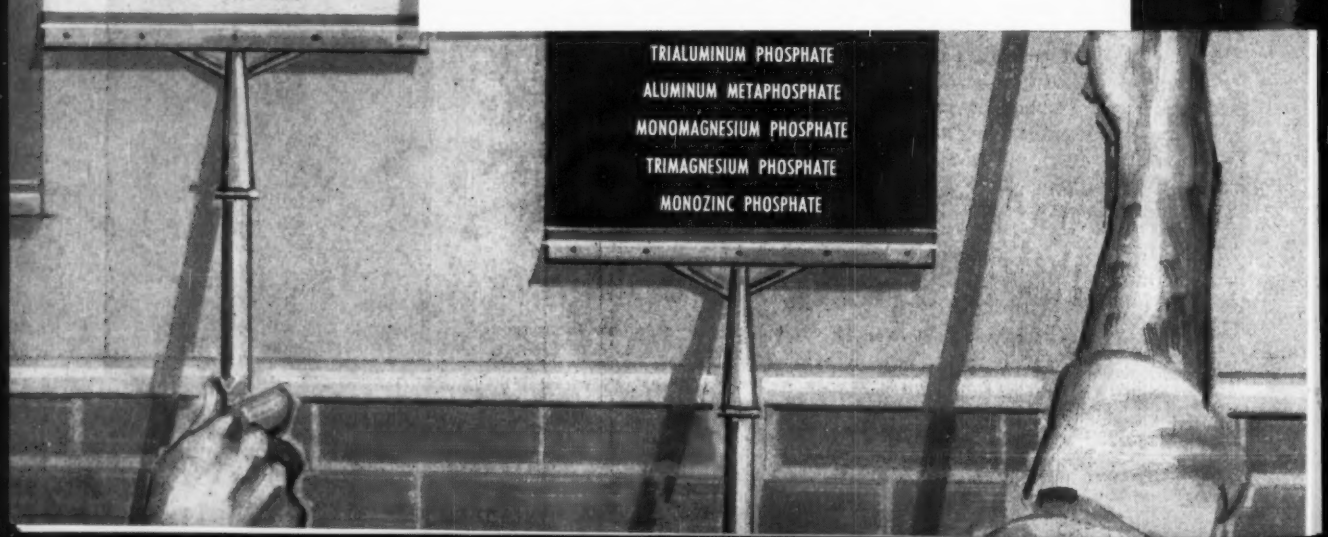

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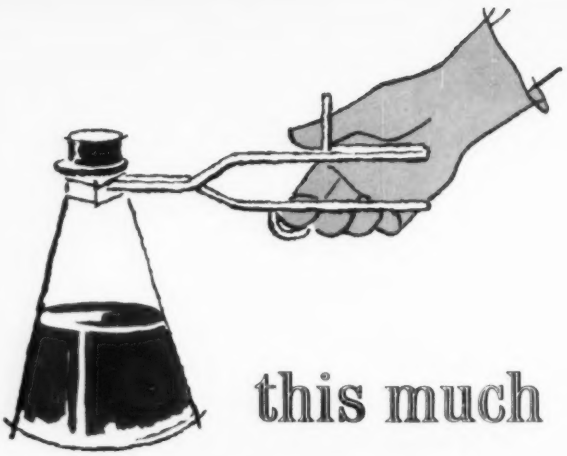

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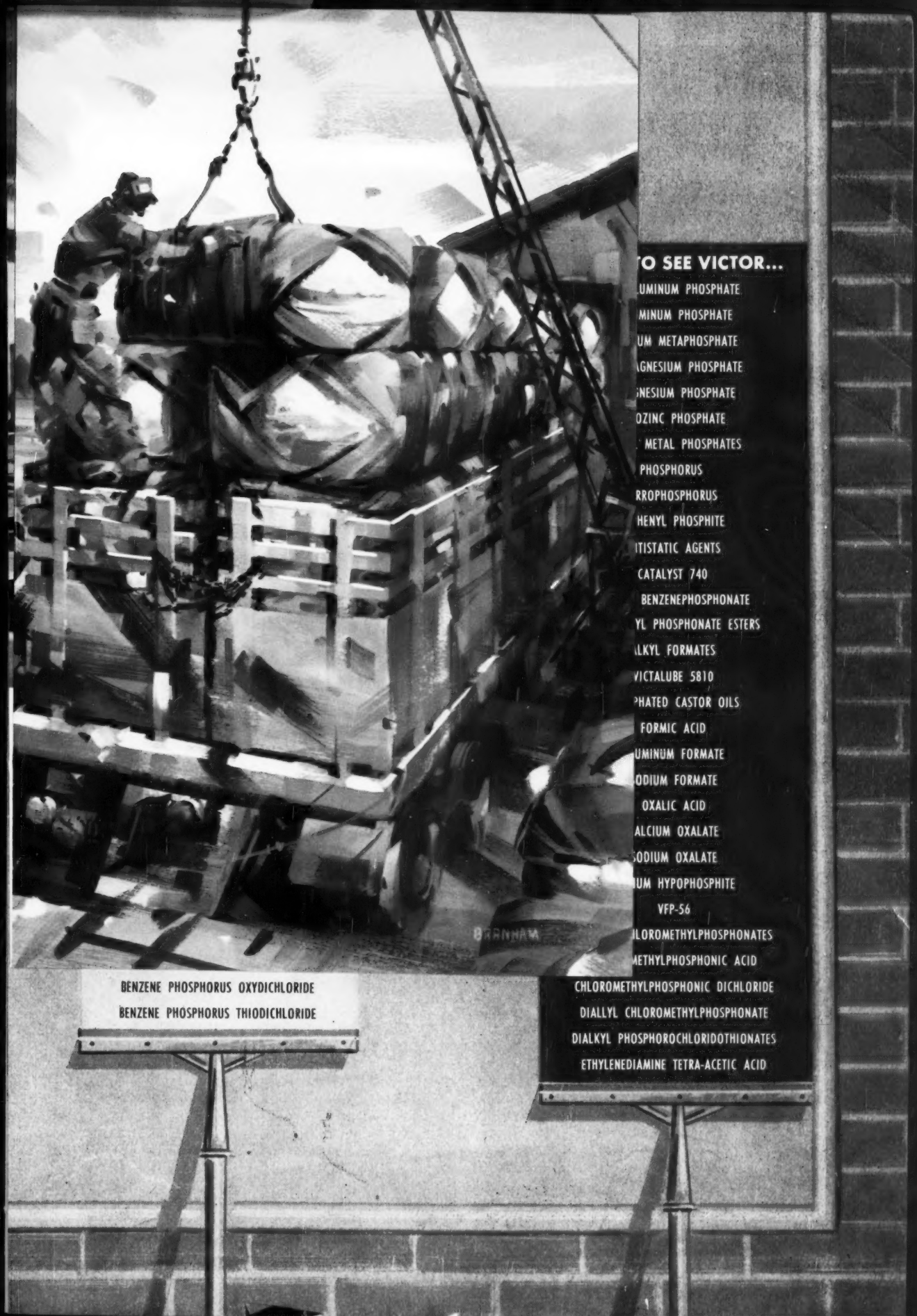
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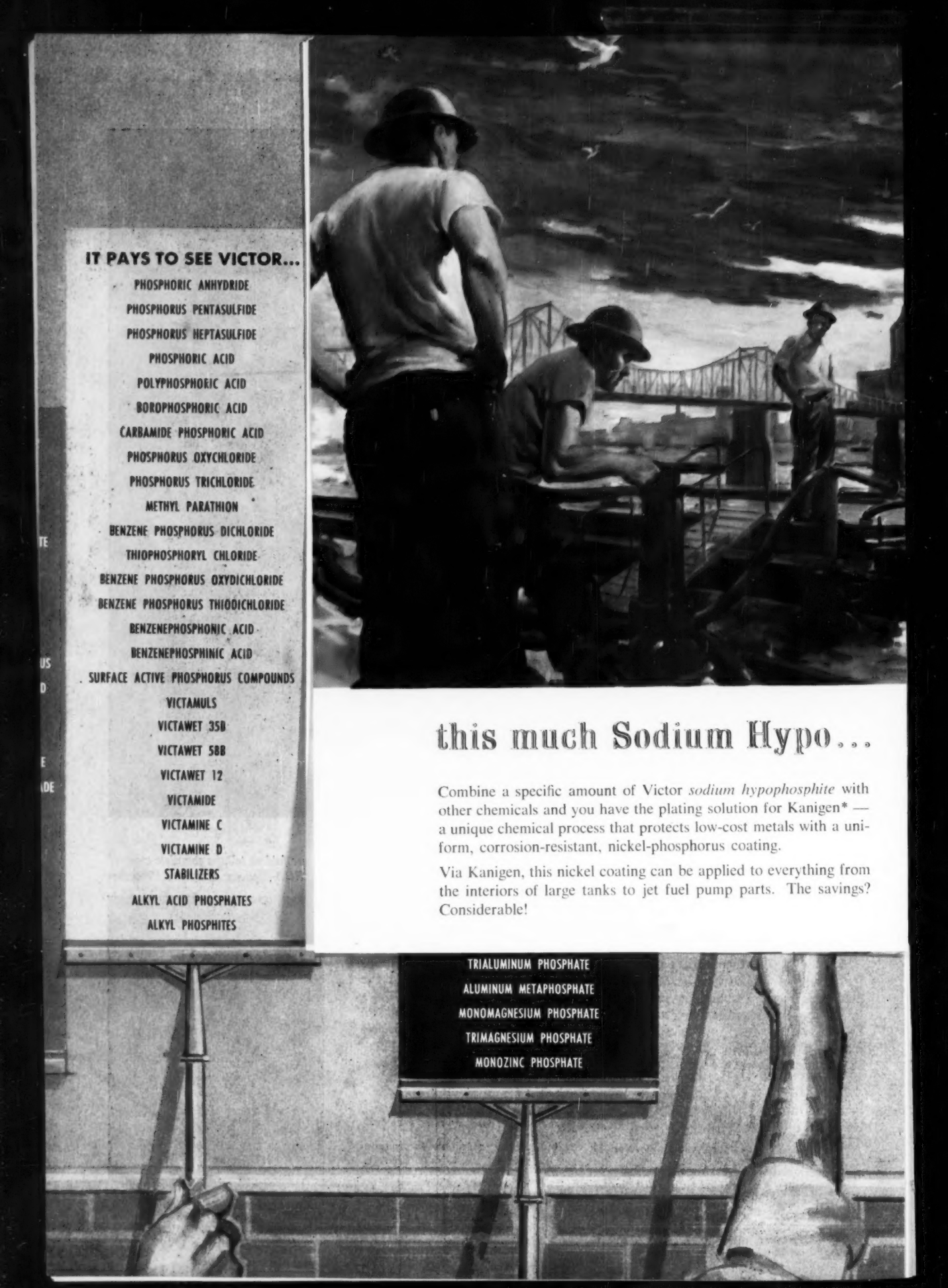
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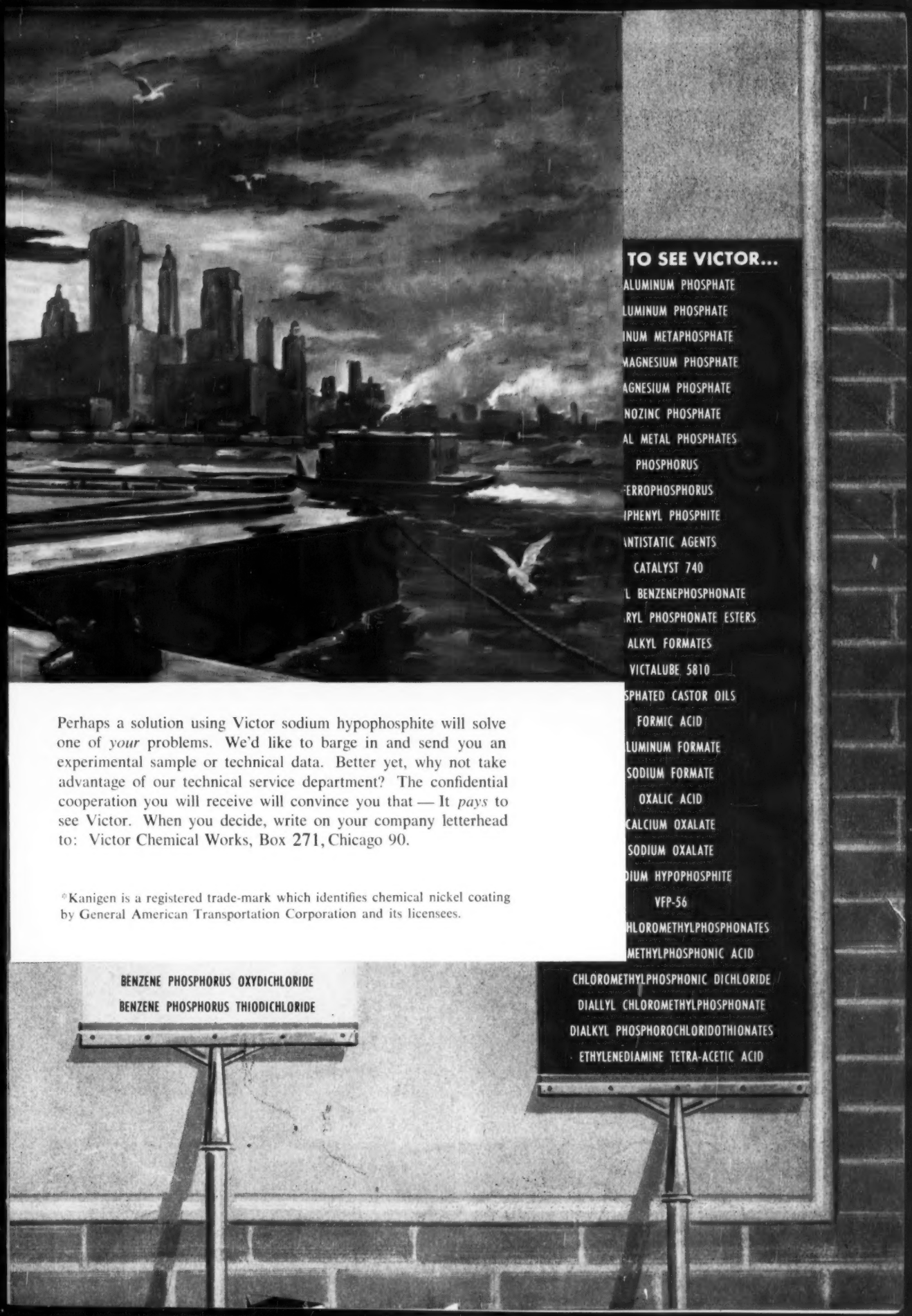

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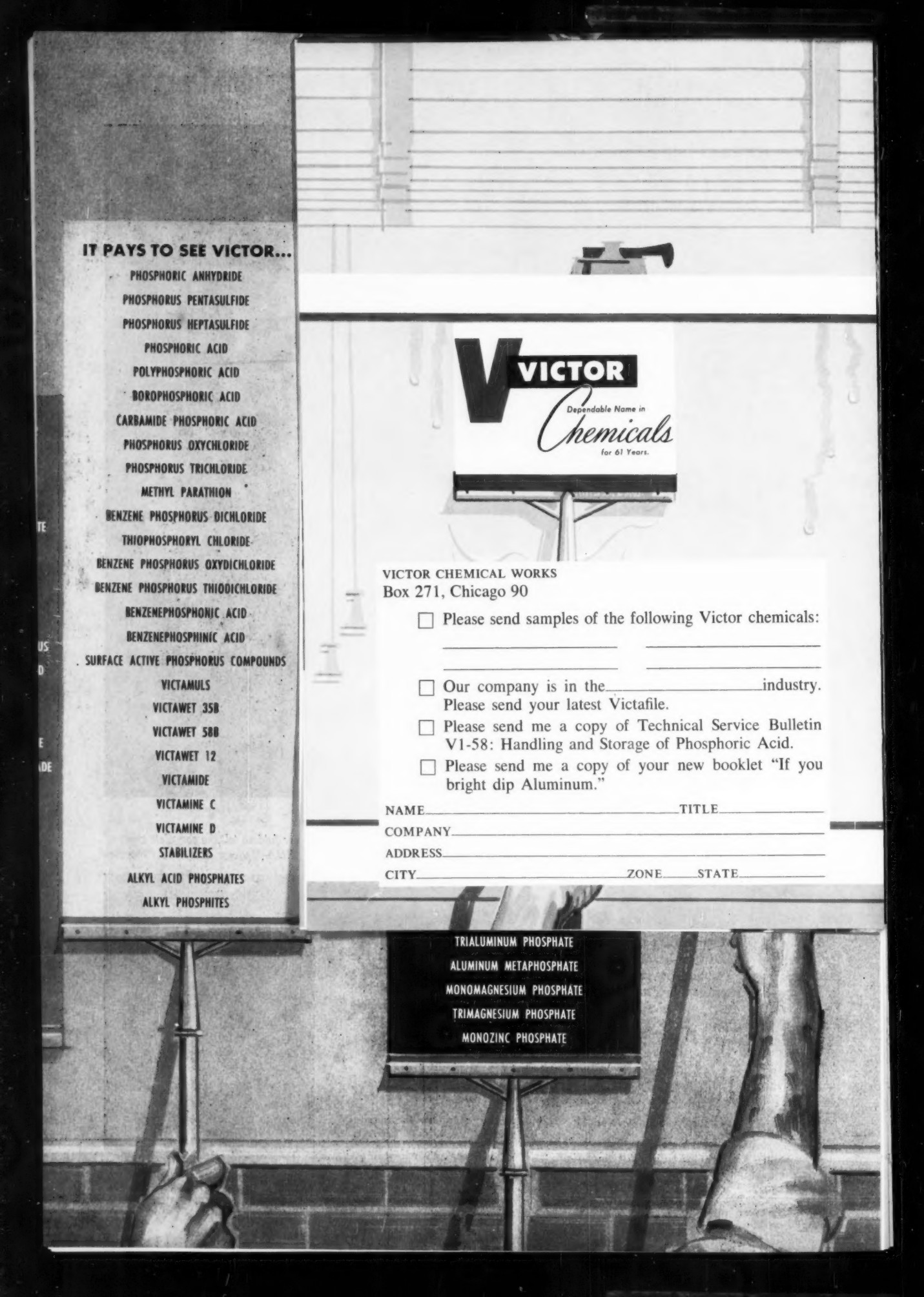
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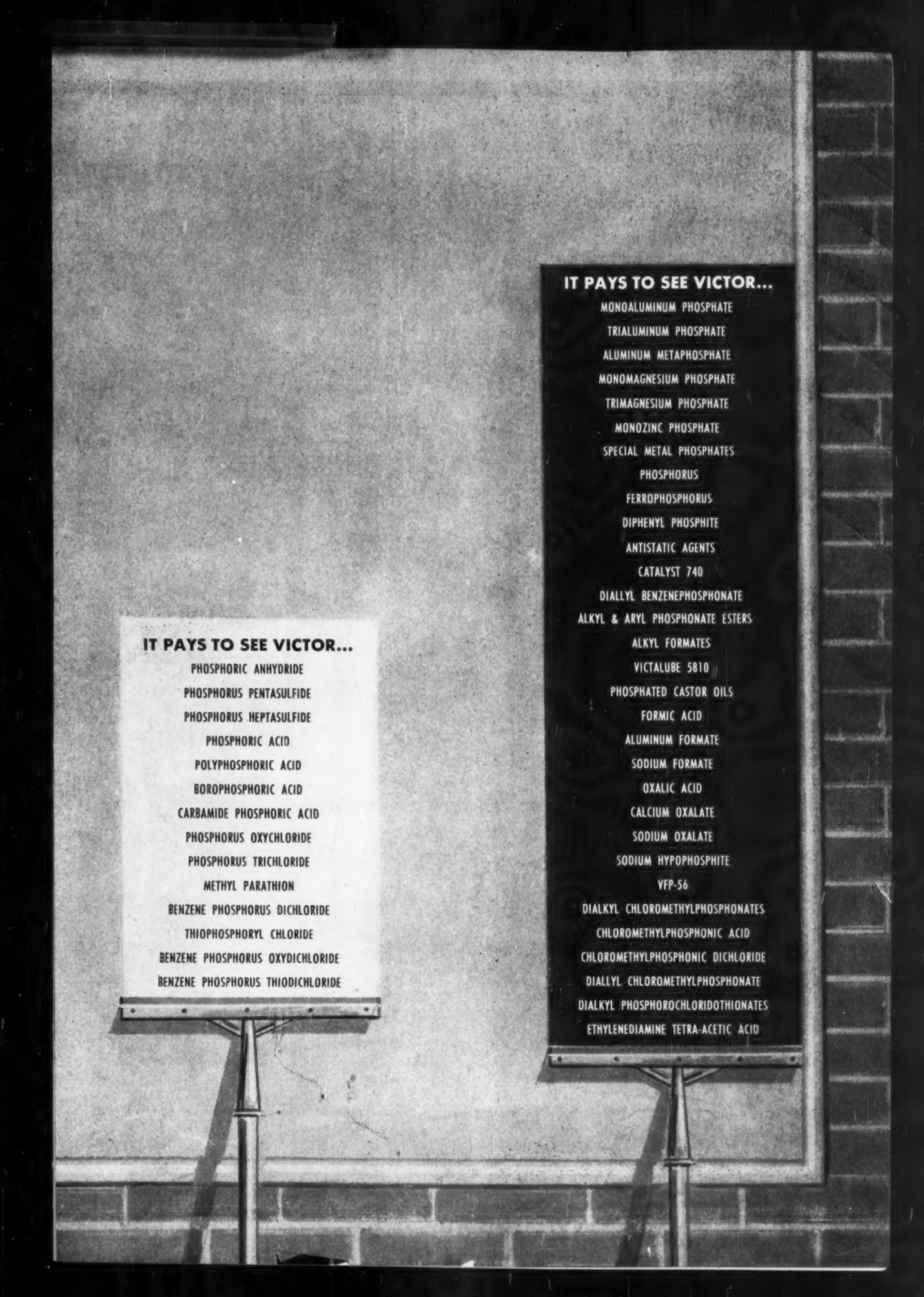
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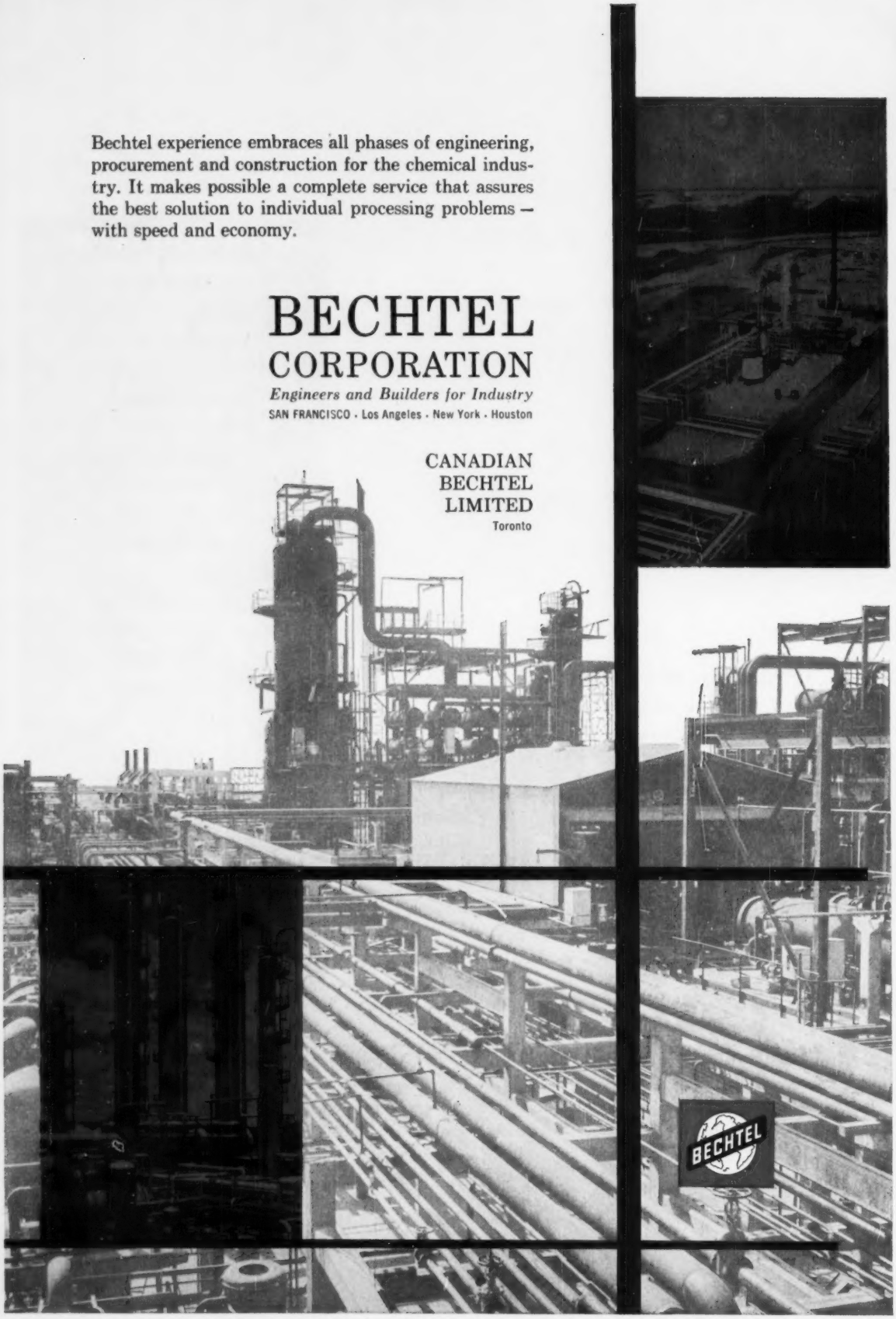
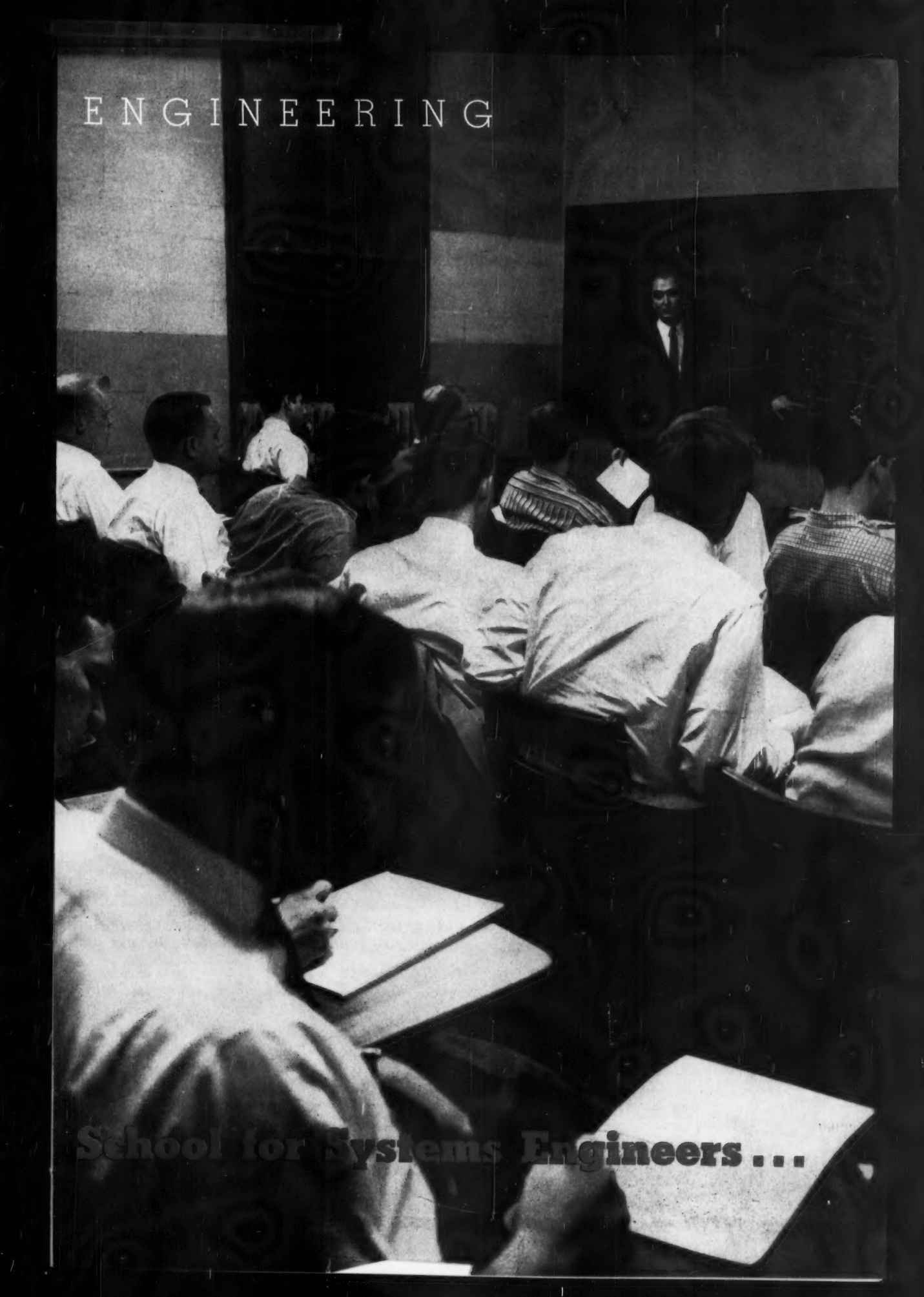



ENGINEERING
School for Systems Engineers . . .

. . . it takes 18 months of hard study

Ten Monsanto engineers are plying their newly acquired systems-engineering skills this week in company plants across the U.S. Products of an intensive education program, the men are nuclei of many systems-engineering groups. Monsanto — which already has a central systems-engineering section in St. Louis (*CW, Jan. 4, '58, p. 43*)—is counting on these converts, and future graduates of the program, to spread the practice of systems engineering throughout the company's production network.

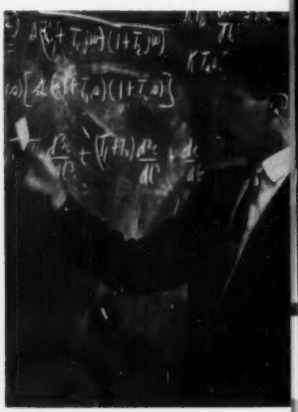
Broader in scope than traditional project engineering, systems engineering claims over-all coordination of the chemical process, reactor and processing equipment, control instruments and human operators. Training for this ambitious function required

(Continued p. 76)

IN CLASSROOM, systems engineers-to-be start by brushing up on math, engineering.

'SYSTEMS' courses are introduced by Prof. Dreijke.

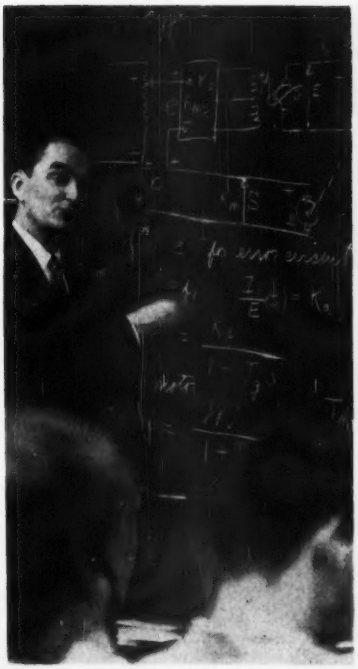
MONSANTO MEN join th other students for . . .



. . . SERVOMECHANISI course by lecturer Houge

CONCENTRATION is written on students' faces.

COMPUTER MAN gives lesson.



IN CLASS, lectures on control theory often inspire . . .

. . . AFTER-CLASS discussions on St. Louis sidewalks.

STREET CORNER is discussion site.

HELPER AT ELBOW, George Vincent tackles homework.

BACK AT THE PLANT, Bob Hudson (right) works with Bill Katt in instrument evaluation laboratory.

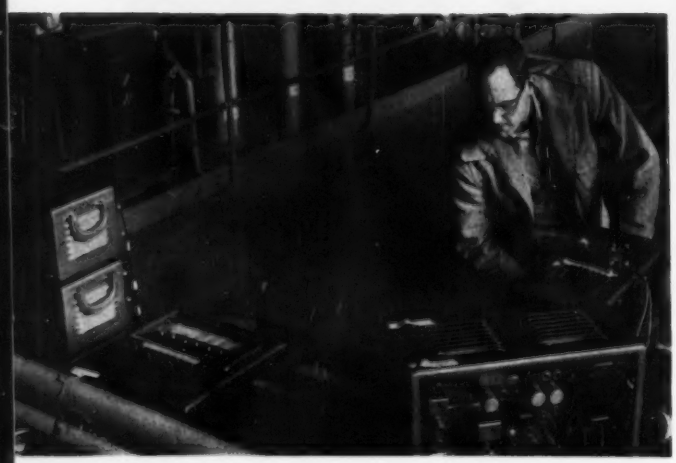
18 months of full-time instruction at St. Louis University. Upon successful completion of the course, the Monsanto men were granted Master of Science degrees.

Monsanto is well pleased with its experiment in making systems engineers of chemical engineers. A class of second-year students is already under way; two engineers of this eight-man group will be sent on for a doctorate (at Washington University; St. Louis University does not offer doctorates in engineering).

Careful Evolution: In developing the program, Monsanto moved care-

WIRED PLUGBOARD enables systems engineer to simulate instrument evaluation tests.

VINCENT PARLAYS STUDIES into useful systems know-how, follows up heat-exchange work started by a graduate of the previous class.



APPLYING SYSTEMS THEORY to heat-exchanger tests in Queeny plant is part of Vincent's thesis work in preparation for Master's degree.

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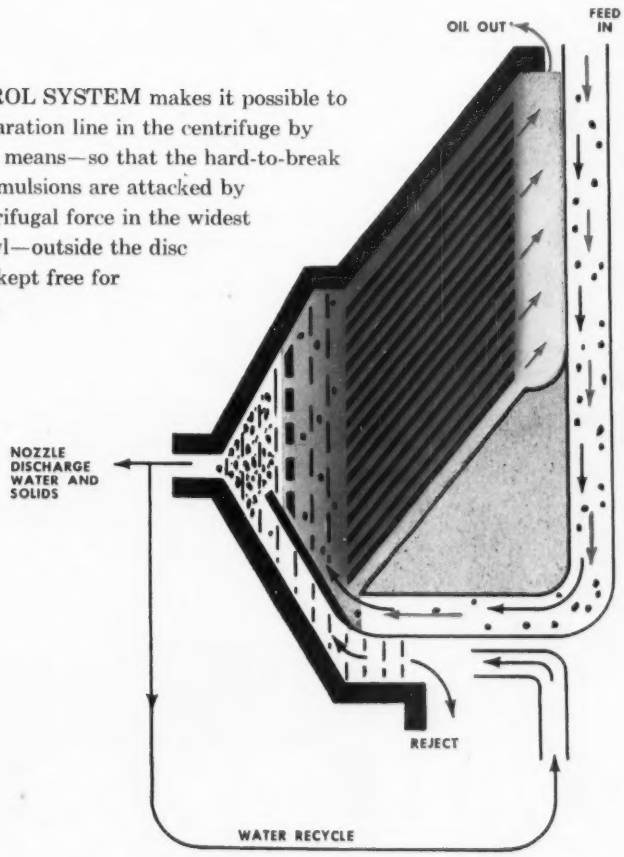

The GRAVITROL SYSTEM *eliminates* "hard-to-dispose-of" oily sludges and oil losses to the solids, as well. Installations handling tank bottoms, residual fuel oils, steel mill lubricating oils and the like, show high reclamation rates in continuous "labor-free", around-the-clock operation, high purity of the oil and easily disposable solids discharge—all of which add up to a quick "pay-out".

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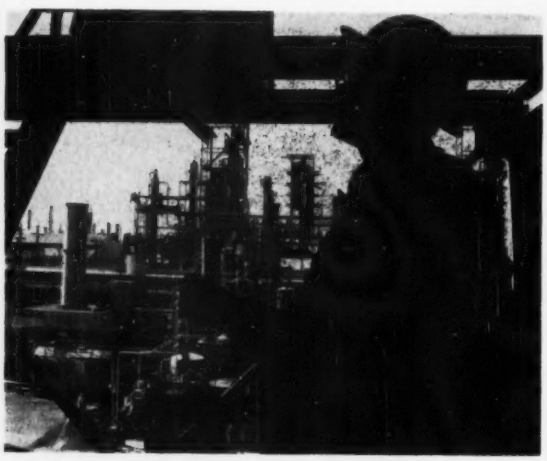
At seminar, Dreifke (left) and Katt demonstrate response of temperature-measuring elements.

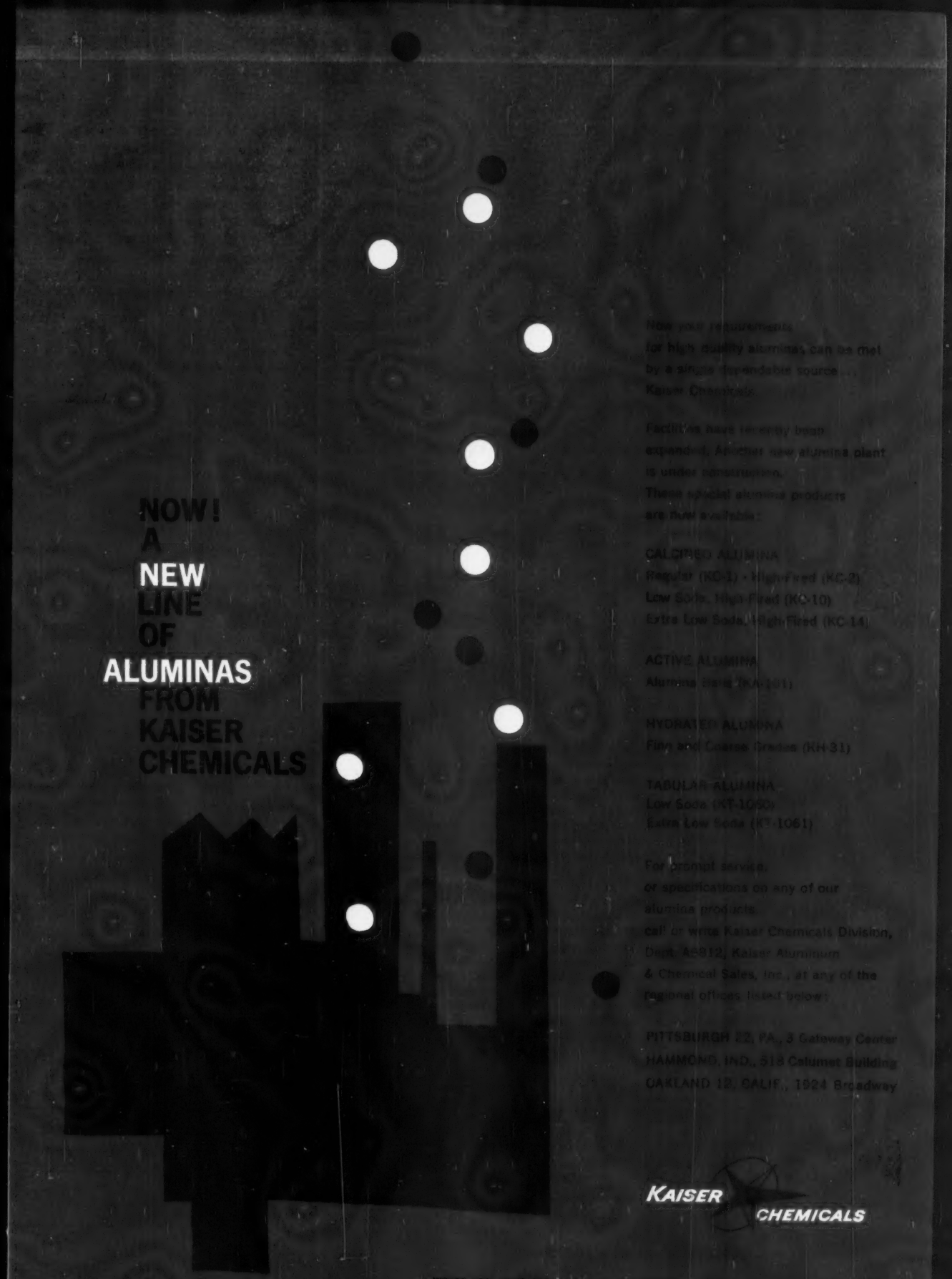
AT LION OIL DIVISION refinery, engineer John Hearn puts his new skills to practice.

fully to be sure that the result would meet the needs of the company. First step, taken in '55, was a survey of the status of chemical process control in this country and abroad. Result: in early '56, plans were laid for the central systems-engineering section. At this point, the lack of trained personnel became evident.

Two experts in systems engineering —Joel Hougen and Theodore Williams—were added to the staff; and three staffers—J. R. Middleton, R. A. Miller and G. E. Russel (now manager of the systems-engineering section)—were granted academic leaves to study systems engineering at three top schools (University of Illinois,



AT TEXAS CITY plastics unit, research engineer M. O. Bird examines site of dynamic test.



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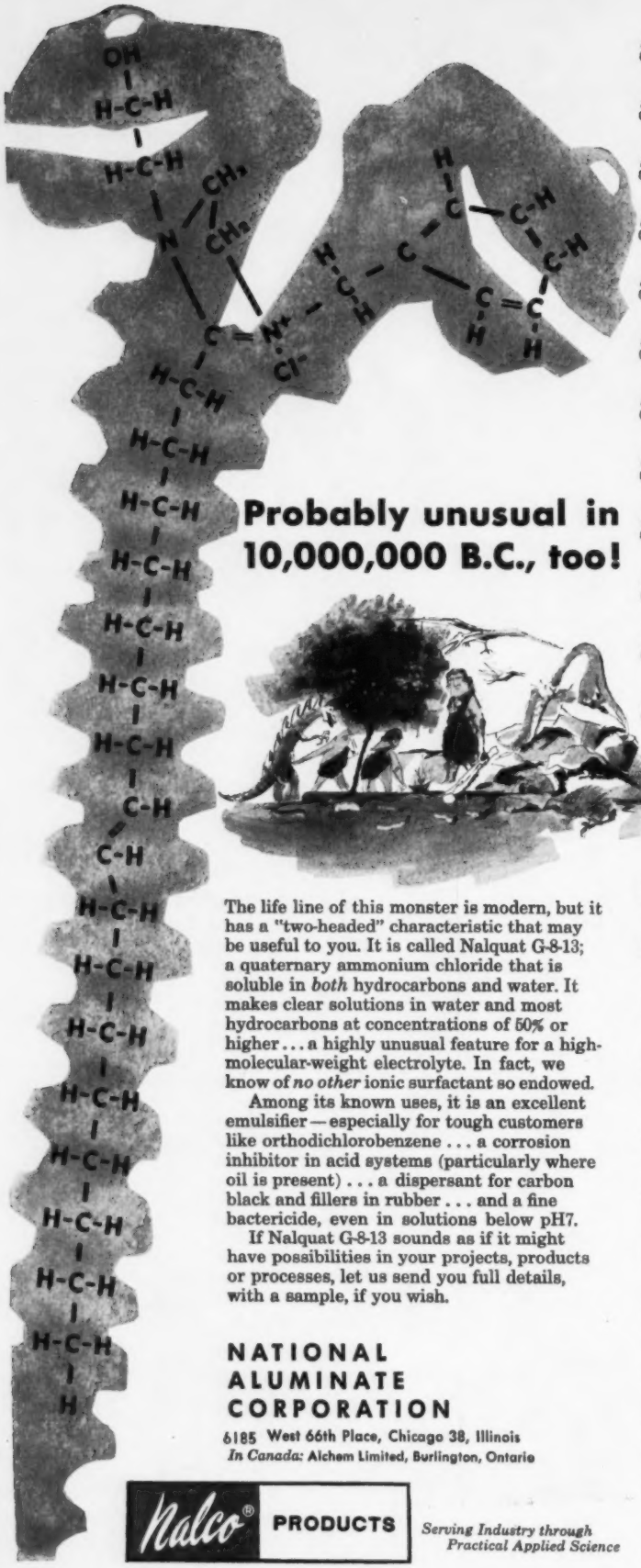

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ENGINEERING

MIT and University of Minnesota).

Prior to the formal organization of the systems-engineering group in March '57, Hougen and Williams attempted to work out courses to train the needed personnel for the section. It quickly became clear that short courses (of several weeks' duration) were not satisfactory. A chemical engineer's typical schooling does not include enough mathematics and electrical engineering to allow him to pick up systems engineering on the run.

Monsanto decided that no existing university course of studies offered just what its men needed. It decided to develop such a course and, with the cooperation of St. Louis University, the company did just that.

Full-Time Schedule: The program worked out by the company and the university calls for the student's full-time participation. The first class started with summer school in June '57, received its degrees last month. Here's the program, chronologically:

- June-September—summer school refresher session in mathematics and electricity.
- September - June — two regular academic semesters, including courses in servomechanisms, digital and analog computers and advanced mathematics.
- June-September — experimental thesis work, using Monsanto facilities.
- September-January—thesis writing and presentation.
- February—graduation, followed by a two-day company seminar, where graduates present their theses to an invited gathering of company and academic personnel.

Handling St. Louis University's side of the program is Prof. Gerald Dreifke, director of graduate studies and head of the department of electrical engineering in the school's Institute of Technology. Hougen is serving as visiting lecturer at the university, keeps an eye on theses being done at Monsanto to make sure that all the work meets academic standards.

No Strings: Although the company ties no strings to the course, it naturally expects that the men will use their training within the company. But length of service was not a criterion for choosing the students. The first-year group ranged in company experience from one to 16 years, in age from 24 to 43.

The 10 men in the first group were evenly divided between those having

"this reactive reducing gas is a strong Lewis acid and burns with a high flame speed and an extremely high heat of combustion"

DIBORANE B_2H_6

Frank G. Ferrick
B.S., Holy Cross College
M.S., University of Notre Dame
Industrial Products Department
Callery Chemical Company

Q. Mr. Ferrick, what is Diborane?

A. Diborane is the simplest compound of boron and hydrogen. For many years a laboratory curiosity because of its unusual bonding, it is now the first commercially available boron hydride and is the basic building block of boron hydride chemistry.

Diborane reacts with many organic functional groups, adds to carbonyl groups and double bonds, complexes with ethers and amines, and decomposes thermally to give higher boron hydrides, such as Pentaborane and Decaborane, and elemental boron.

Q. Can you mention a practical industrial use for this highly reactive gas?

A. It can be used to prepare a series of Trialkyl Boranes, which are excellent catalysts for vinyl polymerization. Special Trialkyl Boranes could be made from Diborane and olefins; the corresponding alcohol or the primary alcohol by rearrangement, can be obtained by oxidation and hydrolysis.

Q. What are some of the industries that might utilize Diborane?

A. The petroleum industry, as one example, could upgrade waste olefinic gases by reaction with Diborane. Some patented uses are known. For instance, catalyst manufacturers can increase the acidity and add some very interesting properties to silica-alumina catalysts by impregnation with Diborane. Other industries exploring its possibilities include producers of amines, polymers, transistors, and rubber. Also, Diborane is a basic chemical in the production of boron-based high-energy fuel.

Q. How can the polymer industry use Diborane?

A. In addition to its patented use as a catalyst for ethylenic polymerization, Diborane reacts at low temperatures with ethylene oxide to form a solid wax-like polymer and with propylene oxide to give a liquid polymer.

Q. Does Diborane have any special advantage as a selective reducing agent?

A. Yes, Diborane rapidly reduces the normally stable carboxylic acids in non-aqueous systems. Also it reduces acid chlorides more slowly than it reduces nitriles or carboxylic acids, in contrast to the relative reducing rates of Sodium Borohydride in dioxane. Diborane also reacts much more rapidly with nitriles than with esters; the reverse is true for Lithium Borohydride.

Q. Is Diborane readily available?

A. Yes. It's now available in pound quantities for developmental uses. Shipments are made in compressed-gas cylinders under special ICC permits. Callery's very economical large-scale process is expected to enable Diborane to become eventually an industrial process chemical. For data about handling and shipping Diborane, please request our Handling Bulletin C-021.

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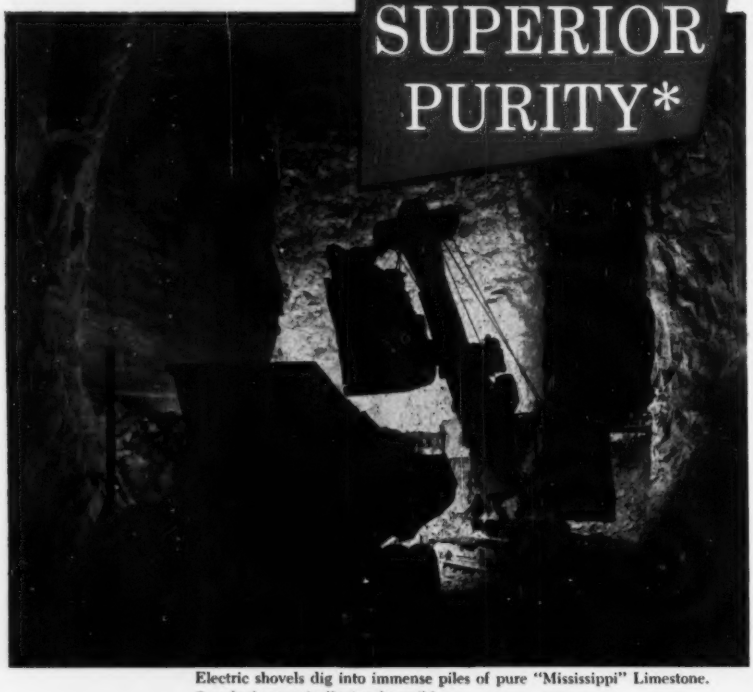

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chemical and electrical training; all but one of the second group have a chemical background.

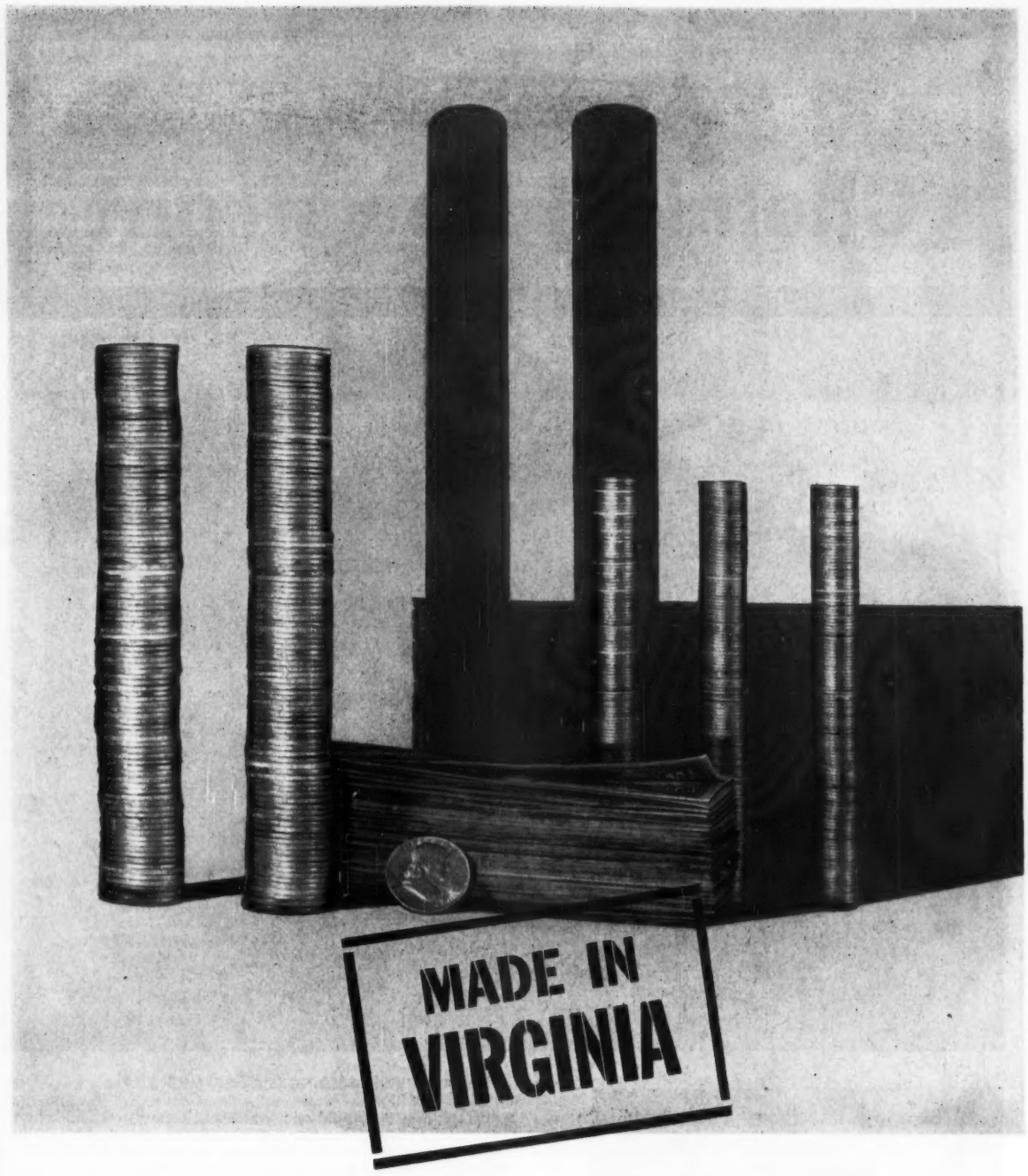
Going to school again was not the only readjustment that the men had to undergo. The St. Louis University courses are offered at night, throwing a pretty effective damper on any after-dark social life. Turning the day around poses problems in finding time to concentrate on studies if active youngsters are part of the household.

But in spite of these drawbacks, plus the competition of highly qualified regular graduate students and the pressure of being the first group in a new experiment, the Monsanto employees acquitted themselves well. Their performance was better than average, according to Dreifke.

Many Benefits: All in all, the new program is providing both partners with many benefits. The company

***SYSTEMS STRATEGY** planners: Russel, Hougen, Hochwalt.*

apparently has a big jump on the industry in the implementation of the systems-engineering concept; and the university counts research data stemming from use of specialized Monsanto equipment (including the analog computer) as an otherwise-unobtainable benefit. It's also getting queries about the program from other chemical companies—a sign that Monsanto's initiative is likely to benefit the industry at large.



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Chemical Newsfront

HYDRAULIC FERTI-SEEDING IS A NEW METHOD being used to seed and fertilize highway slopes on the new Connecticut Turnpike. Seed and fertilizer are mixed with water and sprayed on slopes by the equipment shown. One filling covers 65,000 square feet in 20 minutes. It is estimated that hydraulic seeding will save well over $1 million in the initial seeding of the 129-mile Turnpike. The even distribution of seed and fertilizer far surpasses that of any manual or mechanical method ever employed by the Connecticut State Highway Department. The use of bulk urea, triple superphosphate and muriate of potash for use in this equipment reduces fertilizer handlings as much as fifty percent. **(Agricultural Division)**

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(Industrial Chemicals Division)

NEW CORDLESS ELECTRIC SHAVER features light-weight (two ounces), damage-resistant case of CYMEL® *melamine plastic*, designed by Raymond Loewy Associates. This smart-looking Universal shaver operates anywhere on ordinary penlight or transistor batteries. The CYMEL case is contoured to fit the hand, corrugated at the top for a natural, easy grip. CYMEL resists breaking, chipping, scratching, perspiration, and corrosion from shaving lotions and battery chemicals. Color, molded in, can't chip or wear off.

(Plastics and Resins Division)

EASING PRODUCTION OPERATIONS for rubber manufacturers is a new *flaked* version of the popular vulcanization accelerator, *N-Cyclohexyl benzothiazole-2-sulfenamide*. Inherently free flowing, CYDAC* *Accelerator Flaked* has virtually eliminated dusting, caking and bridging problems encountered in using powdered material. The result is cleaner handling and quicker, more accurate weighing. CYDAC is also particularly well-suited for use in the automatic compounding equipment which is finding increasing use in the rubber industry. (Organic Chemicals Division).

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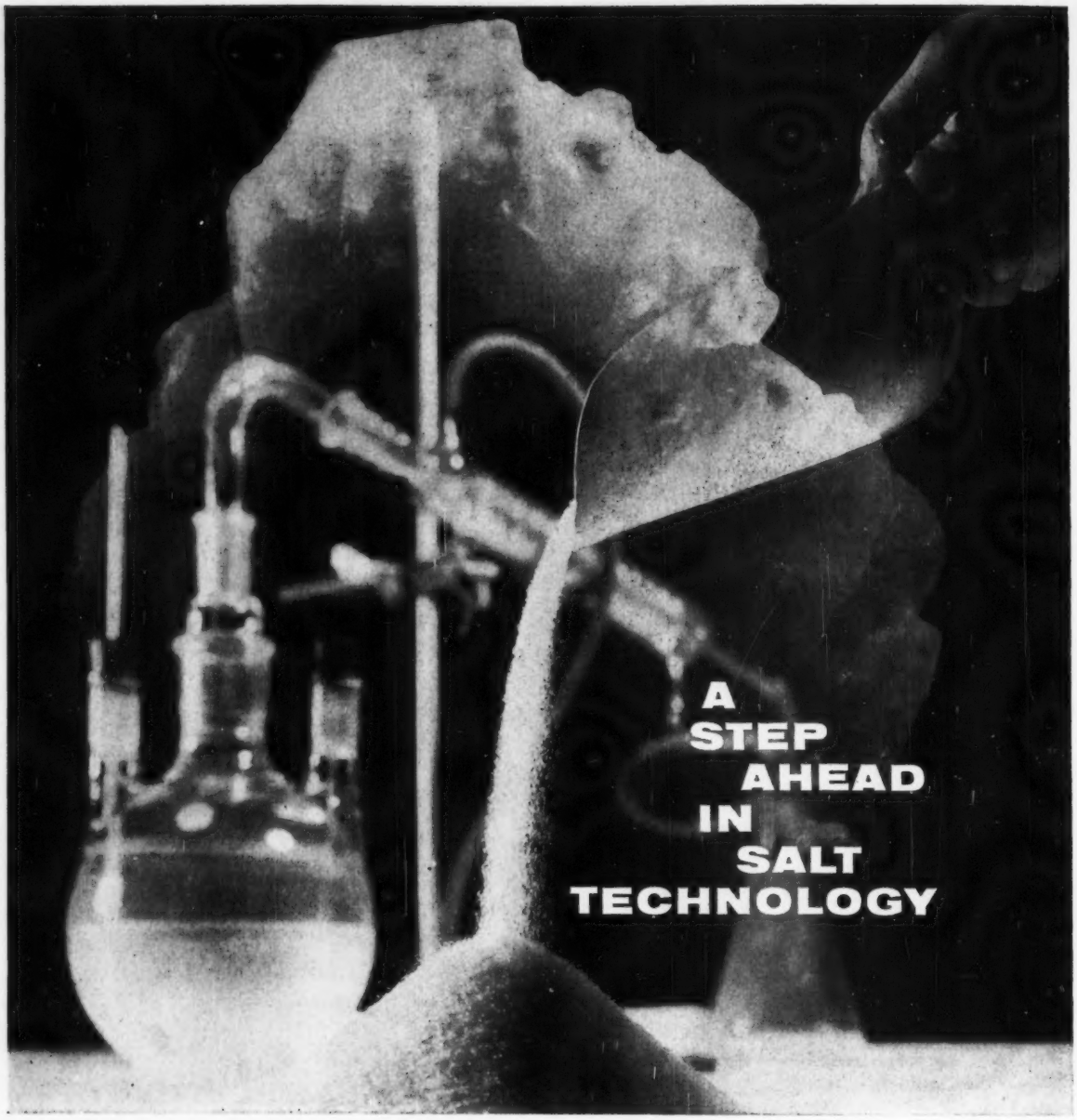

Photo montage by Loebel shows pouring of evaporated salt, distillation setup, rock salt crystal.

New laboratory centralizes three major types of salt research

International Salt Company's new central laboratory—in the heart of midtown New York—houses the most extensive research program ever undertaken in salt.

Technical data flows into the new laboratory from International's control labs, university affiliates, farms and other sources all over the world. Highly skilled scientists apply this data to studies of the three important aspects of salt—its basic characteristics, its production, its uses.

They probe deeply into the chemical and crystalline nature of salt—even its atomic structure—to develop better salt products, refining techniques and quality controls.

The laboratory also helps customers use salt more efficiently—in processes ranging from preparation of animal feeds to making brine for electrolytic cells, from stabilizing soil to regenerating municipal water softeners.

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New fibers, new versatility spark viscose resurgence

Producer	*Designation*	*Properties*	*Typical Use*
American Enka Corp.	Skyloft	Solution-dyed, resilient, non-pilling	automotive carpeting
	Fiber 500	resistant to stretch while wet	blending with cotton and hydrophobic fibers
American Viscose Corp.	Fiber 40	" "	" "
	Super L	solution-dyed, soil-retarding	carpets and rugs
North American Rayon	Comiso	high-strength tow	suiting
	Narcon No. 1	high-strength staple, high shrinkage	knit goods, dress fabrics
	Narcon No. 2	high-strength staple, normal shrinkage	sheets, blankets
Courtaulds (Alabama) Inc.	Corval	cross-linked cellulosic, soft hand	blending with synthetics for lightweight suiting
	Topel	cross-linked cellulosic, alkali-resistant	blends with cotton, acetate and nylon
	SM27	resistant to stretch while wet	blending with cotton and hydrophobic fibers
Du Pont, Textile Fibers Dept.	Type 272-F Super Cordura	requires no adhesive	mechanical rubber goods (e.g., belts)
	Ondulé	imparts slub effects to fabrics	suiting
	Civona	straw-like yarn	draperies, millinery
Tyrex, Inc*	Tyrex	high durability	tire cord

*Formed by American Enka, American Viscose, Beaunit Mills, Courtaulds (Canada), Industrial Rayon

Rayon holds surprises for textile men, as researchers mold it in greater varieties of strength, color, hand, stretch resistance.

Rayon Flexes Its New Muscles

Rayon makers believe that new cross-linked or stretch-resistant varieties of viscose (*above*) should be called something other than rayon. So they're huddling with the fiber labeling experts in the Federal Trade Commission this week to see if something can be done about the problem.

The outcome of the FTC hearing, which covers proposed rules and regulations under the Textile Fiber Products Identification Act, could have an effect on viscose research—and increase the sale of viscose fibers.

Courtaulds (Alabama) Inc. is typical of the rayon firms that, having patiently researched modifications of viscose that are competitive with newer hydrophobic fibers, are now weighin the commercial outlook.

Its cross-linked cellulosics, Topel

and Corval, are up for formal discussion at the current FTC hearing. (Newer, still-developmental stretch-resistant fibers aren't yet slated for formal talks.)

Courtaulds (Alabama) President Charles Paine explains: "These cross-linked fibers are different, chemically and physically, from rayon; and they cost more to produce. We are confident the commission will modify its rules to permit them to be distinguished from conventional rayon."

On new fibers in general, he adds: "We expect to sell these newer fibers at higher prices and for different uses than conventional rayon. But we need a way to distinguish them, so that consumers will know that they're getting a different fiber for the extra cost."

Paine figures that even if new names for the novel cellulosics aren't allowed, it won't halt viscose fiber research. He feels, though, that it may proceed less vigorously. Further research funds would stem from broad commercial acceptance of the new fibers, and this in turn depends on consumers' recognizing their novelty and being prepared to pay a higher cost.

Paine holds high hopes for Topel and Corval, new commercial members of a family of cross-linked cellulosic fibers under development by Courtaulds. Chemical details are guarded.

Water absorbency and swelling properties of both fibers are comparable to those of cotton, both can be dyed with dyestuffs normally used for cellulosics. Topel has a higher wet initial tensile modulus than rayon and features good dimensional stability to laundering and resistance to alkalis, enabling fabrics to be caustic-treated. It supplies desirable effects (e.g., soft hand) in blends with cotton, acetate, and nylon. Corval imparts a wool-like hand, can be blended with synthetics such as Orlon.

Cross-linked fibers, such as these, are only one area of improvement that viscose makers are counting on to spark a market resurgence. Others are low wet-stretch fibers, improved tire cord, and acetylated viscose (which differs from acetate rayon in being oriented before acetylation).

Three new fibers expecting to pioneer this new market are Courtaulds' SM27, American Enka's Fiber 500 and American Viscose's Fiber 40. Similar, chemically, they are regenerated cellulose that has been physically modified to resist stretching while wet. While details of the fiber-making process haven't been disclosed, the newcomers are believed to have longer, better oriented cellulose chains than regular rayon. The latter normally stretches appreciably when wet, returning to its former length when dry. Each of the three new, man-made cellulosics feature low extensibility when wet, making it practical to process fabrics made of them on shrinkproofing (e.g., Sanforizing) equipment. End-uses similar to those of cotton are anticipated.

Paine: He argues for a name change.

While viscose has become firmly ensconced in tire-cord uses, thanks to research, even more improvements are in the offing. Recently, Tyrex, Inc. (the cooperative promotional and research group), disclosed tests of its new Tyrex cord in auto tires. The tires, a spokesman reports, "have shown extraordinary high-speed performance and tread-wear characteristics, in addition to softer and quieter riding qualities."

Another yarn to watch is Alon, made by Toho Rayon Co. (Japan). This acetylated viscose features high strength. In finished form, it must, of course, be handled like acetate yarn and is reputedly expensive. But its development illustrates the versatility researchers are showing in finding new viscose applications.

What's the future for fibers based on regenerated cellulose? If FTC comes through with permission to call chemically novel forms by a name other than rayon, it could be bright but that doesn't mean regular rayon is standing still. All sorts of improve-

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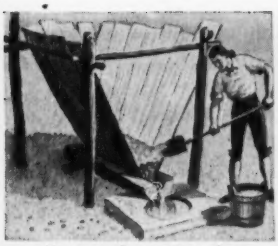
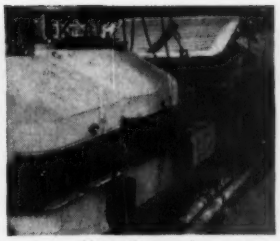


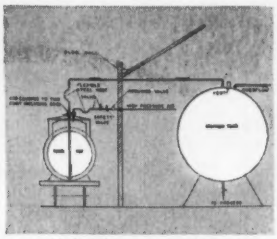
History of caustic soda



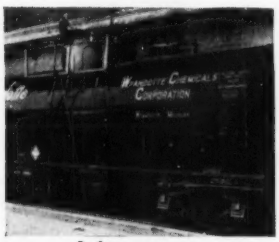
How it's made

Best methods of shipping

Materials for various processes



Unloading procedures



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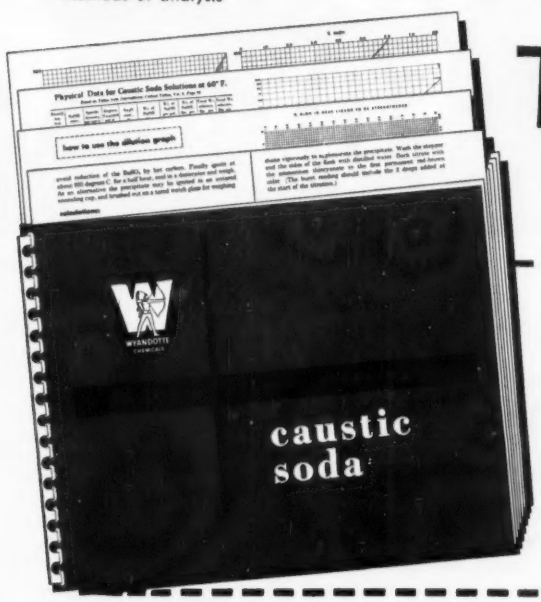

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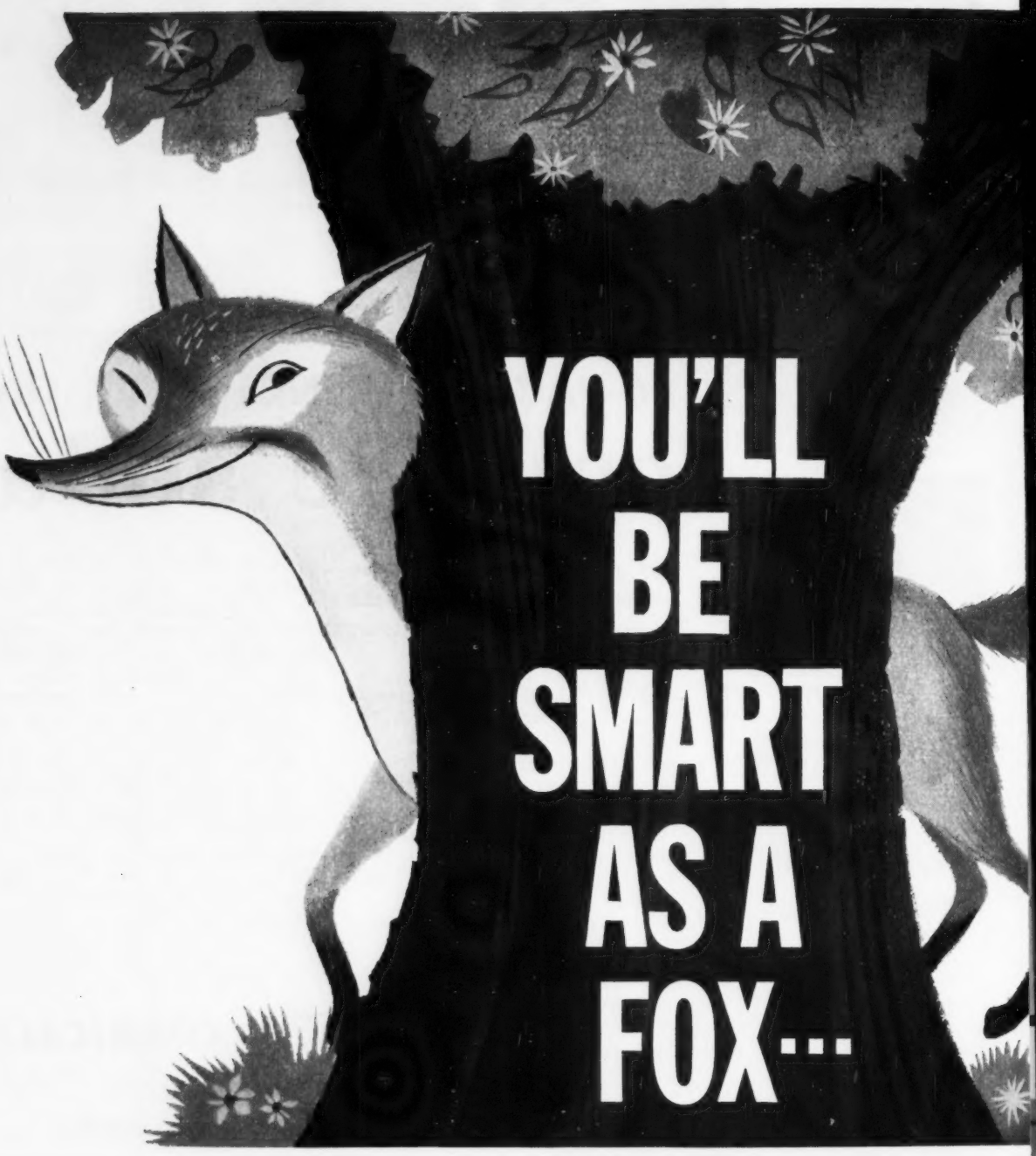

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ments and variations of the conventional fiber have been coming along —solution dyeing, improved physical properties, novelty effects, etc.—and these are contributing to increased sales.

However, for better appreciation of what's happening to viscose, it's necessary to consider each major commercial form of the fiber—filament, staple, and tire yarn—separately. Filament sales have been declining because of competition from the newer synthetics; staple has shown a general increase (although with some ups and downs) since '37; tire yarn has replaced cotton, but is now suffering some inroads from nylon. But nylon's and viscose's share of the tire-cord market are now relatively stable. Some authorities feel that future output of both will go up or down in accordance with tire demand.

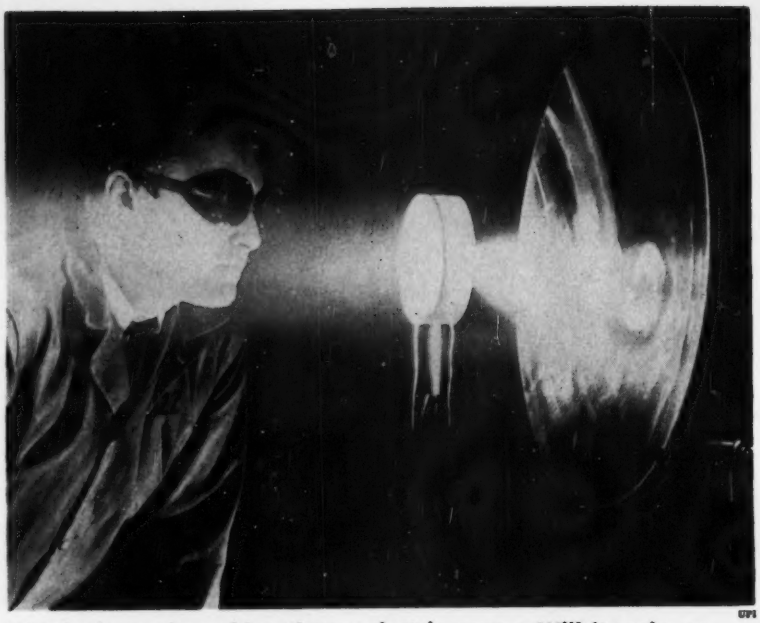
Because of the relatively unattractive position of filament, research on this form of the yarn has not been as great as on the other forms. Staple and tire-cord research have figuratively "slopped over" onto the filament in many cases.

Even so, all segments of the viscose fiber market add up to a healthy 50% of the man-made fiber market (U.S. man-made fibers totaled 1,606,700,000 lbs. in '58), acetate 20%.

Despite this market strength, viscose producers are having their hands full competing not only with synthetics but also with improved natural fibers.

Paine, for one, points out that viscose's immediate objective isn't to equal cotton. He feels that has already been accomplished and without the limitations, such as fiber deniers available, that the use of cotton imposes. Now, viscose makers are trying to excel cotton and are planning a host of new fibers for the purpose. Nylon, expected to be in the 350-360-million-lbs./year range by '60 (*CW, Feb. 7, p. 36*), is another target. Improving viscose to blend with synthetics generally to impart desirable textile properties and reduce textile costs is also on the upswing.

How well viscose researchers succeed in this struggle depends on a variety of conditions. But recognition from FTC of the uniqueness of chemically novel cellulosics may be important in deciding the outcome.



UPI

Westinghouse is probing thermoelectric power. Will it make an . . .

Attack on Battery Markets?

Next month's Power Source Conference*, sponsored by the Signal Corps, will get some special attention from makers of chemical batteries. Reason: the meeting's attention to research and development of nonchemical electric power sources is giving commercial battery makers new reason to evaluate a potential threat to their markets.

Right now, the military is most closely interested in the new "batteries." But, a *CW* check of commercial battery makers shows, the new units can't be discounted as competition—the question is, How immediate is the threat? And views vary:

Martin Kagan, vice-president of Yardney Electric Corp. (New York), manufacturer of special cells such as silver-cadmium types, doesn't think his company's products will be seriously challenged by thermo- or nuclear-cells. He says, "There is no real competition between chemical and nonchemical power sources. Most nonchemical types are generators, whereas chemical cells are storage units, usually rechargeable. Each has its own use with a certain amount of overlap."

*13th Annual Power Conference, Shelburne Hotel, Atlantic City, April 21-23.

Bernard Mayer, general manager of Alkaline Battery Division of Gulton Industries (Metuchen, N.J.), put the time to worry about these new units a decade or more off: "It will take 10-20 years for thermoelectrical and solar power systems to become economically feasible to the point where they can compete with chemical batteries."

But National Carbon Co., a division of Union Carbide, is plainly hedging its bets—the company has a "very large" program for developing both chemical and nonchemical packaged-power sources. National's philosophy: both have a place in the future of packaged power.

In This Corner: There are three new approaches to electric power that have been getting keen attention from commercial battery makers:

- Westinghouse Electric Corp.'s system to convert heat directly into electricity (*cut*).
- Martin Co.'s Snap III atomic power pack (*CW Technology Newsletter, Jan. 24*).
- University of California-Los Alamos Laboratory's Plasma Thermocouple.

Although the military now has the

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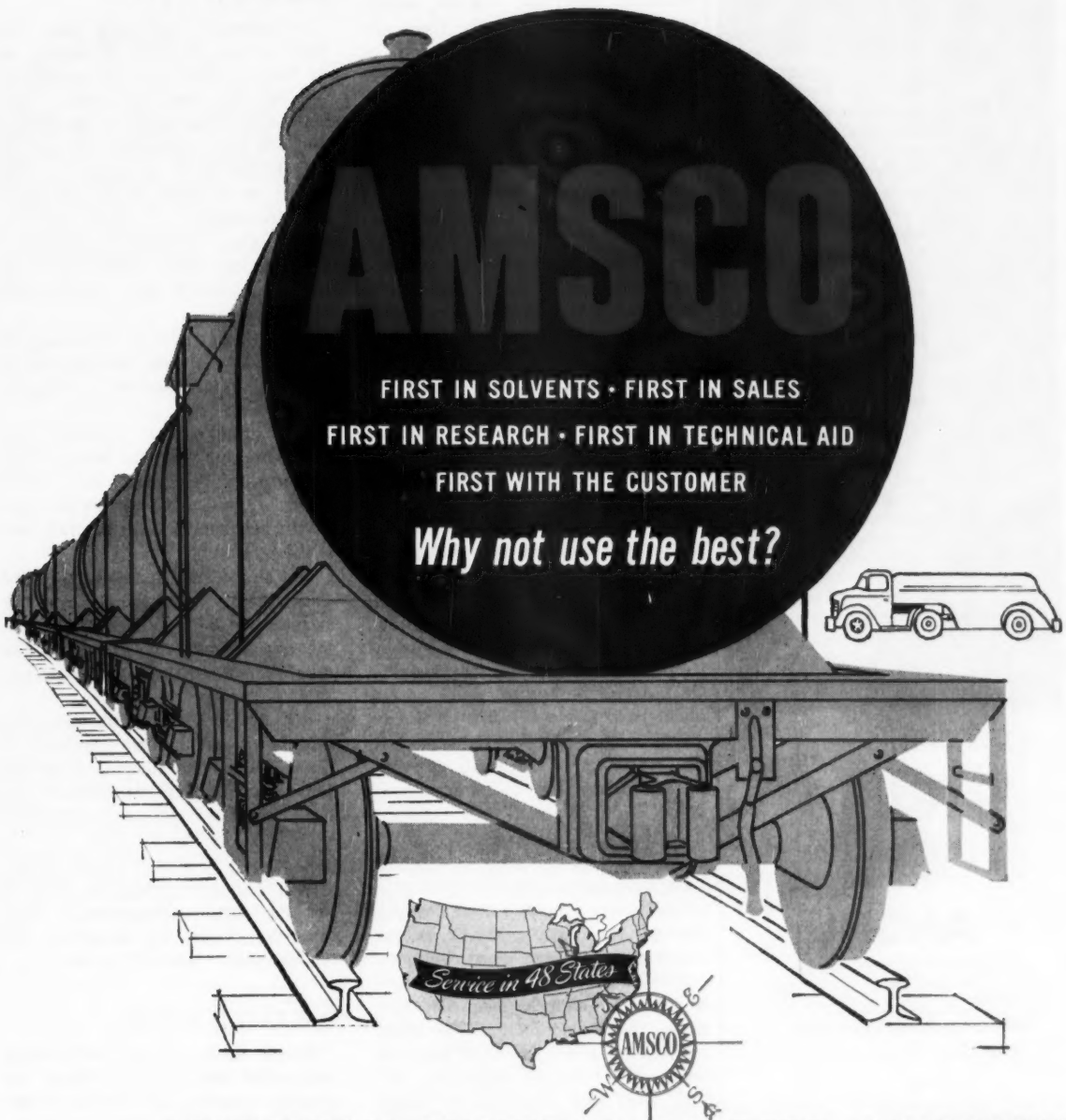
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greatest interest in these units, their developers are optimistically plugging away at upgrading their inventions, or coming up with new ones. The aim is to commercialize them.

Westinghouse Electric Corp.'s thermal converter is based upon "thermoelectric materials," chemical compounds that have the ability to turn heat directly into direct current. They are "metallic" compounds (nickel, iron, cobalt or manganese in combination with anyone of these four elements: tellurium, oxygen, sulfur or selenium) in ceramic form. A "charge carrier" (e.g., lithium ion) is introduced that changes place with, say, a nickel ion, forcing remaining nickel ions to change valence. These "mixed valence" compounds set up a flow of current when heated.

Clarence Zener, Westinghouse director of research, claims that "although the system does not yet exhibit the efficiency demanded by conventional methods of power generation, there are several inherent advantages: raw materials are inexpensive, easily obtainable; they are stable and chemically inactive; they do not require extreme degree of purity and will not deteriorate in the presence of radiation."

Martin Co.'s Snap III is presently being scaled up. The 5-watt test model that made headlines a few weeks ago, powered with polonium-210, is commercially valueless. Key to its 8-10% working efficiency was 20 thermocouples of lead telluride. AEC's plans: a 100-watt device fueled with strontium-90, designed to operate a decade without servicing or refueling.

Still in the "experimental stages" is University of California's Plasma Thermocouple heat-to-current converter. First reported last October, it could then generate 10 watts/sq.cm. (of emitter). Now researchers there have upped output to 30 watts/sq.cm. Where a normal thermocouple employs two metals, U. of C. researchers explain the "plasma thermocouple" uses one metal and an ionized gas. Uranium carbide, first used as a "thermionic emitter," is being replaced by a solid-solution form of uranium carbide and zirconium carbide. High heat input (in the range 1400-1800 K) produces a continuous flow of energy from the emitter.

Ultimate aim of the project: a nuclear reactor-plasma thermopile. In such a reactor, heat produced by atomic fission could be turned directly into electricity.

So far, the unusual ideas for sources of electric power have been from researchers outside the commercial battery field. But it's still too early to say if the present battery makers will let their markets be usurped by newcomers.

EXPANSION

• Hoffmann-La Roche, Inc. will build a new chemical laboratory at its Nutley, N.J., research center.

• Battelle Memorial Institute will build a new laboratory for plutonium research near Columbus, O. It's reputedly the first privately financed facility of its kind, should be ready by midsummer.

• Visking Co., division of Union Carbide Corp. (New York) has set up separate research and development organizations.

• Eli Lilly and Co. (Indianapolis) will establish a new electron microscope laboratory, headed by Charles Reimer.

• Textron Inc.'s affiliate, MB Manufacturing Co., has formed Propulsion Test Facilities, Inc. (New Haven, Conn.), which offers environmental test facilities for aircraft and missile research.

• Calumet & Hecla, Inc. (Allen Park, Mich.) will treble its research facilities, enabling its Wolverine Tube Division to intensify efforts in the missile, rocket and atomic energy fields.

• Gulf Oil Corp. (Pittsburgh) has transferred its Refinery Technology Laboratory in Philadelphia from the Manufacturing Dept. to the Gulf Research and Development Co. (Harmarville, Pa.).

• Mallory - Sharon Metals Corp. (Miles, O.) has reorganized its research and development department, is stepping up studies of zirconium, titanium, other "special" metals.

PRODUCTS

Acrylic Entry: A new acrylic-type transparent thermoplastic polymer for injection molding and extrusion has been developed by J. T. Baker Chemical Co. (Phillipsburg, N.J.). Called PL-11, the plastic is similar in me-

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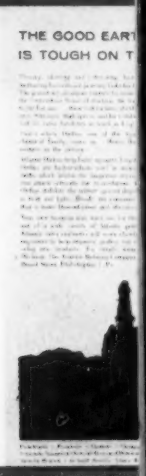

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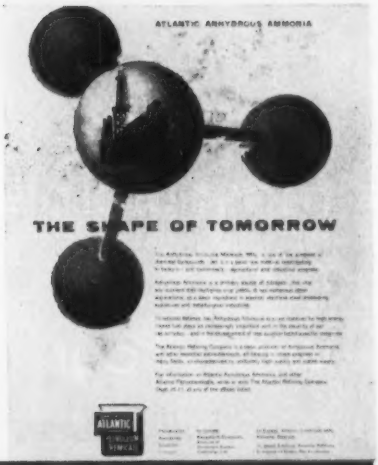

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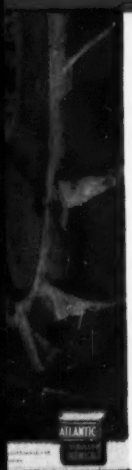

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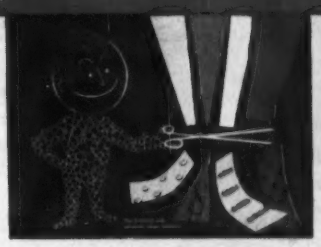

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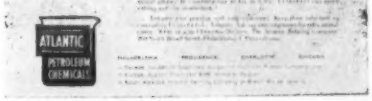

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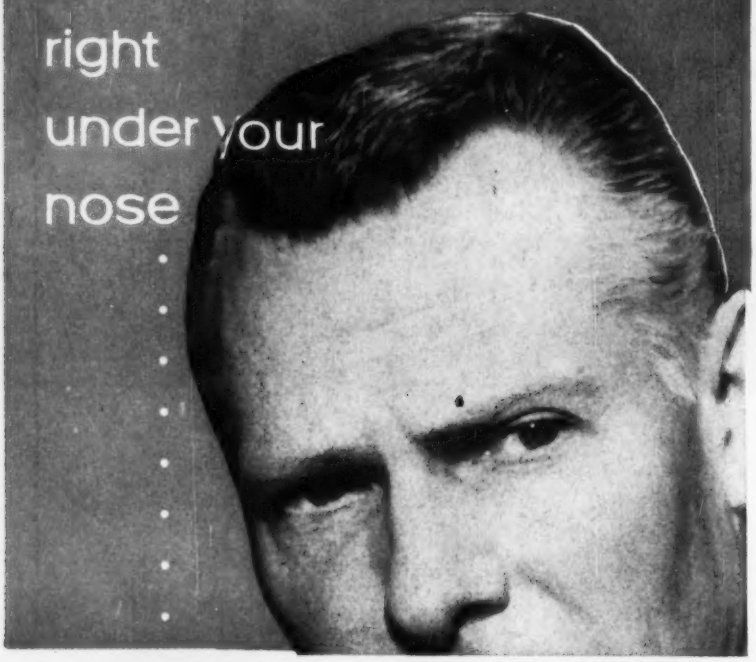

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Chromic Chloride: Diamond Alkali Co. (Cleveland) now offers commercial-grade anhydrous chromic chloride for evaluation as an intermediate in manufacturing organic chromium compounds, as a catalyst in the polymerization of olefins, and other uses. Samples and technical data are available from the firm's research center in Painesville, O.

•

More Krypton-85: The Atomic Energy Commission has increased the availability of krypton-85 for civilian uses to 100,000 curies/year. It's useful for activating phosphors in self-luminous light sources, has a half-life of 10.27 years. Price: $50 for each of the first two curies, $15 for each additional curie.

•

Polyamino Acids: A series of recently synthesized polyamino acids is now available in commercial quantities from Mann Research Laboratories (New York). Included: Poly-L brand aspartic acid; glutamic acid; hydroxyproline; lysine hydrochloride; and lysine hydrobromide. They reportedly have antibacterial and antiviral properties.

•

Metal Acetonates: Westco Chemicals Inc. (Portland, Ore.) is now producing commercial quantities of ferric acetyl acetonate and chromium acetyl acetonate.

LITERATURE

• The improvement of corrosion- and moisture-resistance of vinyl alkyd paints by addition of wet-ground mica is reported in "Some Studies on the Water Vapor Permeability and the Corrosion-Protective Characteristics of Vinyl Alkyd Paints." It's available (free) from the Wet Ground Mica Assn. (420 Lexington Ave., New York).

• United Carbon Products Co. (Bay City, Mich.) has published a Spectroscopic Graphite Products Catalog (S-58), includes information on graphite rod, powder and preformed electrodes. It's available at no charge.

• Remington Rand's (New York) new free catalog R 8964.5 describes interchangeable type available for

CHOOSE FROM 100 RARE EARTH SALTS

One of them may offer you unexpected and profitable advantages

a report by LINDSAY

The unique properties, intriguing characteristics and amazing versatility of the rare earths suggest the possibility of their usefulness to you. It's not unlikely when you consider that rare earth salts are being used today in production processes involving glass, metals, ceramics, chemicals, fabrics, paint and pharmaceuticals, just to name a few.

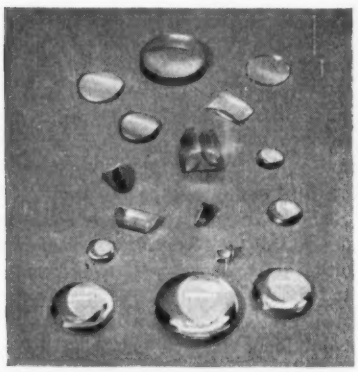
Even today, some manufacturers have not investigated the rare earths because they still think they are *rare*. That is not so. Only a few years ago, the rare earths were little more than laboratory oddities, except of course for a few well-known basic and critically important applications.

It will interest you to know that we are producing more than 100 rare earth, yttrium and thorium salts. We can make prompt shipments in commercial quantities. And at extremely favorable prices.

If you are concerned with research, product development or production processes, it will be significant to you that there has been a vast change in rare earth production during the past ten years . . . in volume, in varieties, in purities of materials commercially available, and in prices.

This is the result primarily of two factors. The curiosity and imagination of research workers who have developed many practical applications. And our own enormously expanded production, particularly of rare earths in high purities up to 99.99%.

Look with us for a moment at some of the interesting developments.



Glass polishing with cerium oxide is one of the most extensive rare earth applications. Lindsay, nearly 20 years ago, revolutionized glass polishing practices in this country when it introduced cerium oxide. Today it is used for polishing millions of spectacles, lenses for cameras and other high precision optical instruments, TV picture tubes, fine quality mirrors, automobile windshields and many glass specialties.

We are operating a fully equipped and capably staffed polishing laboratory continually working on quality control and evaluation of new formulas. If you have a polishing problem, you may find it fruitful to talk with us.

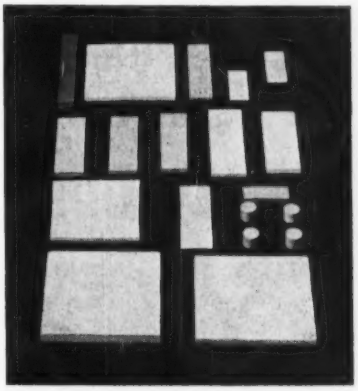
Rare earth garnets for electronic equipment are structurally somewhat similar to the garnet variety grossularite (formula $Ca_3Al_2(SiO_4)_3$). The most interesting ones are the rare earth-iron garnets such as $Y_3Fe_2(FeO_4)_3$. This mouthful of formula has been abbreviated by researchers to "YIG" for obvious reasons. Other names stem from other rare-earth symbols. These garnets, particularly those of yttrium, gadolinium, erbium, and some others have interesting ferrimagnetic properties, making them useful as ferrite materials in electronic equipment.

We don't make the garnets but we can supply the correct material for this particular application, and, of course, helpful technical service.

Neutron absorbing rare earths are now available in ample quantities and at reasonable costs for use as poisons in nuclear reactors. Europium is the most effective control rod material but is relatively scarce and expensive. Control rod designers are making progress in demonstrating the desirable performance characteristics of gadolinium, dysprosium, samarium and erbium.

We would be happy to supply to qualified persons information about significant developments in this field.

Sintered shapes. Through our laboratory research, we have developed a process for producing rare earth oxides in sintered shapes. This information is



now available to you if your experimental work indicates this a desirable form of the rare earth oxides.

Rare earth and yttrium metals are now available from Lindsay. Many users of rare earths prefer them in this form. Our high purity rare earth metals are furnished primarily in the form of ingots or lumps. They are available for prompt shipment from our inventory in experimental quantities.

You will find costs reasonable and advantageous for your research or product development and production operations. Want more information?

This report indicates a wide range of commercial interest in the rare earths. Certainly they have a quite remarkable flexibility and versatility in their application to many uses.

We can't tell you how to use the rare earths in your processes. But we can offer you technical data which may be of interest to your research people.

Please tell us your area of potential interest and we'll try to supply information which is most helpful to you.

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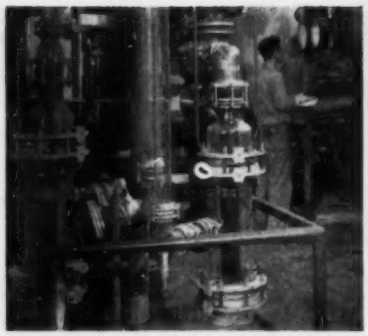
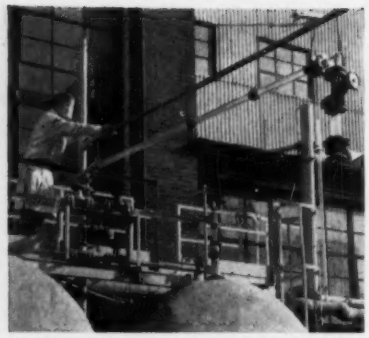


At Trubek Laboratories, Inc., East Rutherford, N. J., 1500 feet of PYREX pipe is used in this reaction system.



Outside storage and unloading station has 200 feet of 2-inch PYREX pipe as well as glass swivel booms.

Inside and out... at Trubek Labs they

TAME TOUGH CORROSIVES

with PYREX® glass pipe

INSIDE Trubek Laboratories, Inc., you'll find a four-component continuous reaction system for handling chlorine, HCl, and a number of corrosive organics.

Part of this system is piping—1000 feet of 1-inch and 200 feet of 2-inch PYREX brand *glass* pipe. Also included are PYREX brand glass Y-valves and Shell and Tube Heat Exchangers.

OUTSIDE at Trubek, you'll see an acid chloride storage system and tank truck unloading station. Here you'll find an additional 200 feet of 2-inch PYREX pipe, as well as special swivel booms made from glass.

Why does Trubek pick *glass* pipe for taming tough corrosives? Because this pipe is made from PYREX brand glass No. 7740. This is the glass that is resistant to more acids and acidic materials than any other pipe. It's the same glass in which laboratory tests for the chemical durability of other corrosion-resistant materials are generally carried out. And you are assured of product purity because PYREX pipe does not contaminate even the most sensitive product.

And, you can *see* what's going on in every inch of PYREX pipe. Should blockage occur—a rare happening because glass is so *smooth* — you can quickly spot it, without costly downtime and dismantling.

Is glass pipe fragile? Not PYREX pipe because it's made to stand up to high temperatures, pressure, and considerable mechanical shock.

How about costs? If you consider that installing glass often requires less time than other materials, you can start with at least one saving. But the *big* economy comes from the fact that glass *lasts*. Example: One firm reports that, after 9 continuous years of piping chlorine through 1600 feet of PYREX pipe, they had no corrosion at all. And maintenance had cost only $6.32 per year.

Why not put all the facts and figures about pipe for handling corrosives at your finger tips. Send for Bulletin PE-3, "PYREX brand 'Double-Tough' Glass Pipe and Fittings." Use the coupon for quick action on your request.

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☐ PE-4 on the all-glass Y-valve.

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RESEARCH

equipping typewriters with special symbols used in research.

• A 36-page catalog of reagents, indicators, stains and culture media most often required by chemical laboratories is now available from Central Scientific Co. (Chicago).

• A free brochure containing information on calculations in urethane technology is offered by National Aniline Division, NA 46, Allied Chemical Corp. (New York).

REPORTS

This report of the National Bureau of Standards is available from the Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C.:

• "Calibration of Liquid-in-Glass Thermometers" (Circular 600, 20¢) gives information on the efficient use of liquid-in-glass thermometers, describes methods of calibrating them.

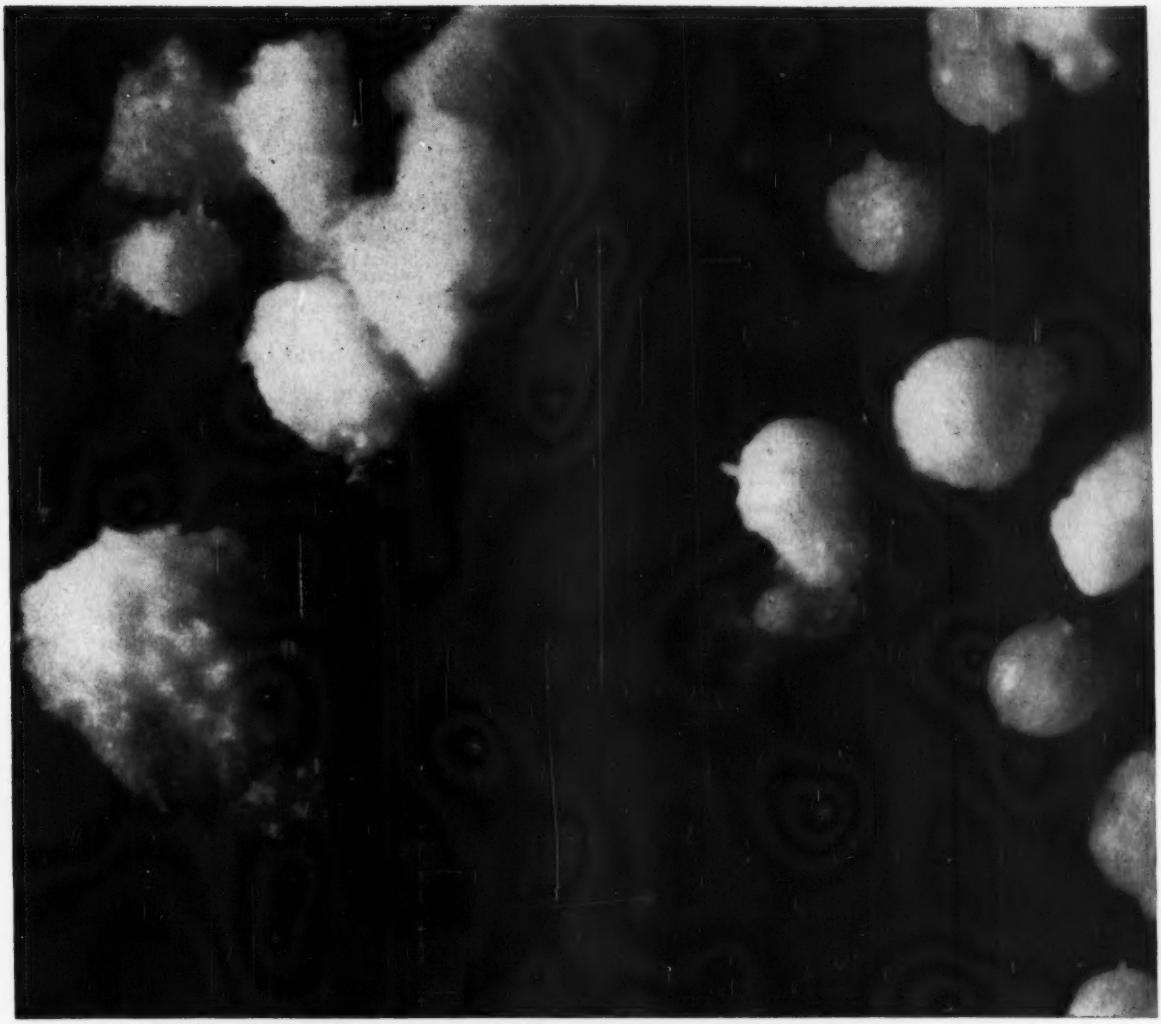
•

These reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

• "Selection and Evaluation of Rare and Unusual Metals for Application to Advanced Weapons Systems" (PB 151311, $3). It is a recent survey of literature dealing with rare-earth metals, hafnium, rhodium and ruthenium. It discusses the abundance and distribution of the rare elements, methods of recovery, reduction to metal, and the physical, chemical and mechanical properties of the elements and their compounds. A bibliography of 752 references is included.

• "Final Report on Solid Electrolyte Battery Systems" (PB 131796, $4) reports that research to find a solid electrolyte battery with long shelf-life and small physical size has resulted in a commercially feasible cell system. It's primarily a silver anode, silver chloride electrolyte and chlorine cathode system.

• A Russian translation of a comprehensive study of the chemistry and uses of organosilicon compounds (59-11239, Organic Silicon Compounds, $10). The study, prepared by a noted Russian chemist, K. A. Andrianov, for use by Soviet scientists and engineers, discusses the methods of preparation, chemical and physical properties of a large number of both monomeric and high-polymer organosilicons.



Photomicrograph shows amazing bulking power of a granule of spray-dried phosphate (left) when compared with conventional form (right).

Photomicrograph shows how to add 30% more bulk to detergents with spray-dried phosphates

The phosphate on the left is spray-dried. It's 70% bulkier than the conventional phosphate on the right.

Add this bulking power to your detergent and you come up with a package that's 20% to 30% larger without adding to your cost a whit.

Two spray-dried phosphates. You can get both sodium tripolyphosphate and tetrasodium pyrophosphate from Hooker in this form. All are sold under the brand name SHEA.®

The spray-dried phosphates dissolve two to three times faster than conventional forms, because of their greater surface area. They are 97% to 99% pure—highest standards anywhere.

The high air content of spray-dried phosphates keeps them loose and free-flowing at all times.

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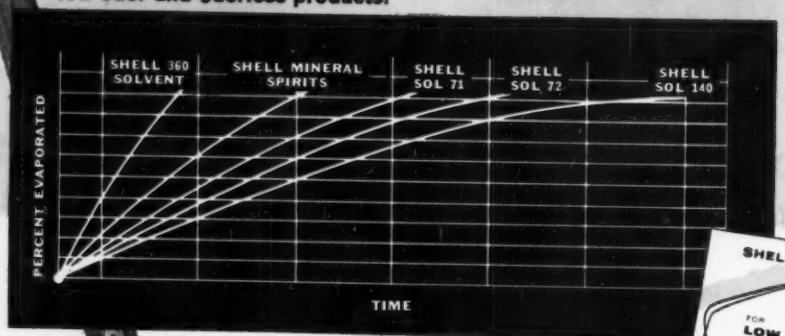
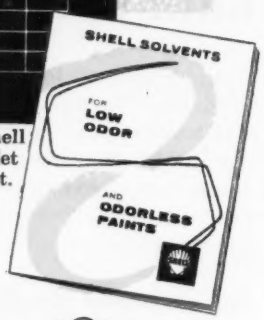
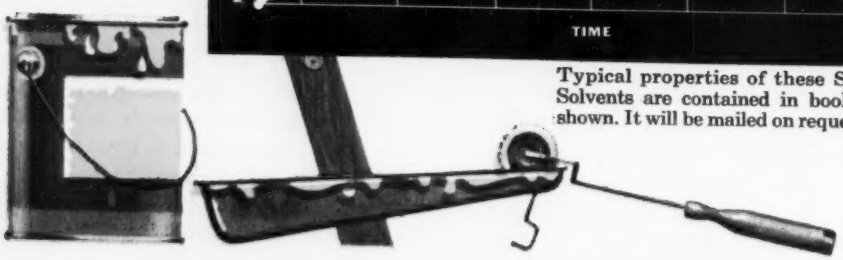
These solvents are recommended for low odor and odorless products.



Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.





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SHELL

Technology
Newsletter

CHEMICAL WEEK
March 21, 1959

A new use—stabilizing and hardening earth—for an old chemical was unveiled at the California Institute of Technology. The chemical is tetrasodium pyrophosphate. Still considered experimental, it reportedly improves soil properties with only one part to 200 of earth. Other soil stabilizers in use: spent sulfite liquor, sodium silicate and calcium chloride, calcium acrylate. CIT engineer Ronald Scott envisions TSPP use in foundations, earth dams and buildings—especially in undeveloped countries where building materials are scarce and costly.

•

Competition for today's Salk vaccine is brewing on two fronts. Chas. Pfizer & Co., Inc., plans to field a new polio vaccine late this spring. The company reports it has an improved version of the Salk vaccine with higher potency than previous commercial types. Pfizer is awaiting approval from the National Institutes of Health and the Dept. of Agriculture.

In the *British Medical Journal* out this week, University of Cincinnati researcher Albert Sabin contends that live vaccine confers better immunity against the three polio viruses than does Salk vaccine, in which the virus is inactivated with chemicals. Sabin cites successful trials of the live oral vaccine on children outside the U.S. Oral vaccine for Russian trials was produced under Sabin's direction at Merck, Sharp & Dohme Research Laboratories (Philadelphia).

A new live-virus oral polio vaccine developed at Lederle Laboratories division of American Cyanamid is now being given to children in Costa Rica and Uruguay. Lederle has reportedly spent over $5.5 million for research on the vaccine in the past 10 years.

One reason major tests of oral polio vaccine have been conducted outside the U.S. is that populations that have not been immunized by the Salk vaccine are required for tests. (And, of course, such tests in the U.S. might weaken the campaign to get more people to take Salk shots; *also see p. 114*).

•

Air Force interest in scandium has been aroused. A $60,000 contract has been awarded to Union Carbide Metals Co. to produce 1 lb. of the metal (which has a density comparable to that of aluminum). The company will make a detailed probe into scandium's characteristics, seeking to determine its melting point. Most authorities claim it's 1200 C, but Air Force interest is partly based on the belief that it's closer to 1550 C.

•

A paper that resists acids, won't burn, won't absorb water, has been developed in the U.S.S.R., according to reports from Prague. The paper, for use in electrical and electronics applications, is made from cotton, asbestos and glass fibers; no water is used in the process. The new product has been in the development stage for some time (*CW, Dec. 22, '51, p. 26*), appears to be similar to glass-fiber papers now reaching

the commercial stage in this country. It is said to be resistant to heat, moisture, chemicals and micro-organisms.

•

Highly theoretical views on the structure of the nucleus were represented last week by a group of practical-minded CPI chemists. The occasion: the first symposium of the New York Academy of Sciences' new Division of Nuclear Physics. Highlight of the meeting was a presentation by John Grebe, director of nuclear and basic research at Dow Chemical Co., of an extension to his periodic table of fundamental particles, unveiled at an NYAS meeting last year (*CW Technology Newsletter, May 3, '58*). His theory: all nuclear components—from the smallest fundamental particle to the complete nucleus of the heaviest element—are composed of orderly geometric arrangements of basic building blocks, described as "balls of energy."

This theory has stimulated widespread interest, says Grebe, but has not yet won physicists' acceptance. Reason: it's postulated on a new concept of the electron that's inconsistent with—though not necessarily contradictory to—the uncertainty principle on which quantum mechanics is based. Other symposium speakers presenting independently derived theories that support Grebe's thesis included O. A. Battista of American Viscose Corp., Du Pont chemist Harold Heighton, American Petroleum Institute Director James Moss, and Alvin Schallis, process engineer with Stauffer Chemical Co.

•

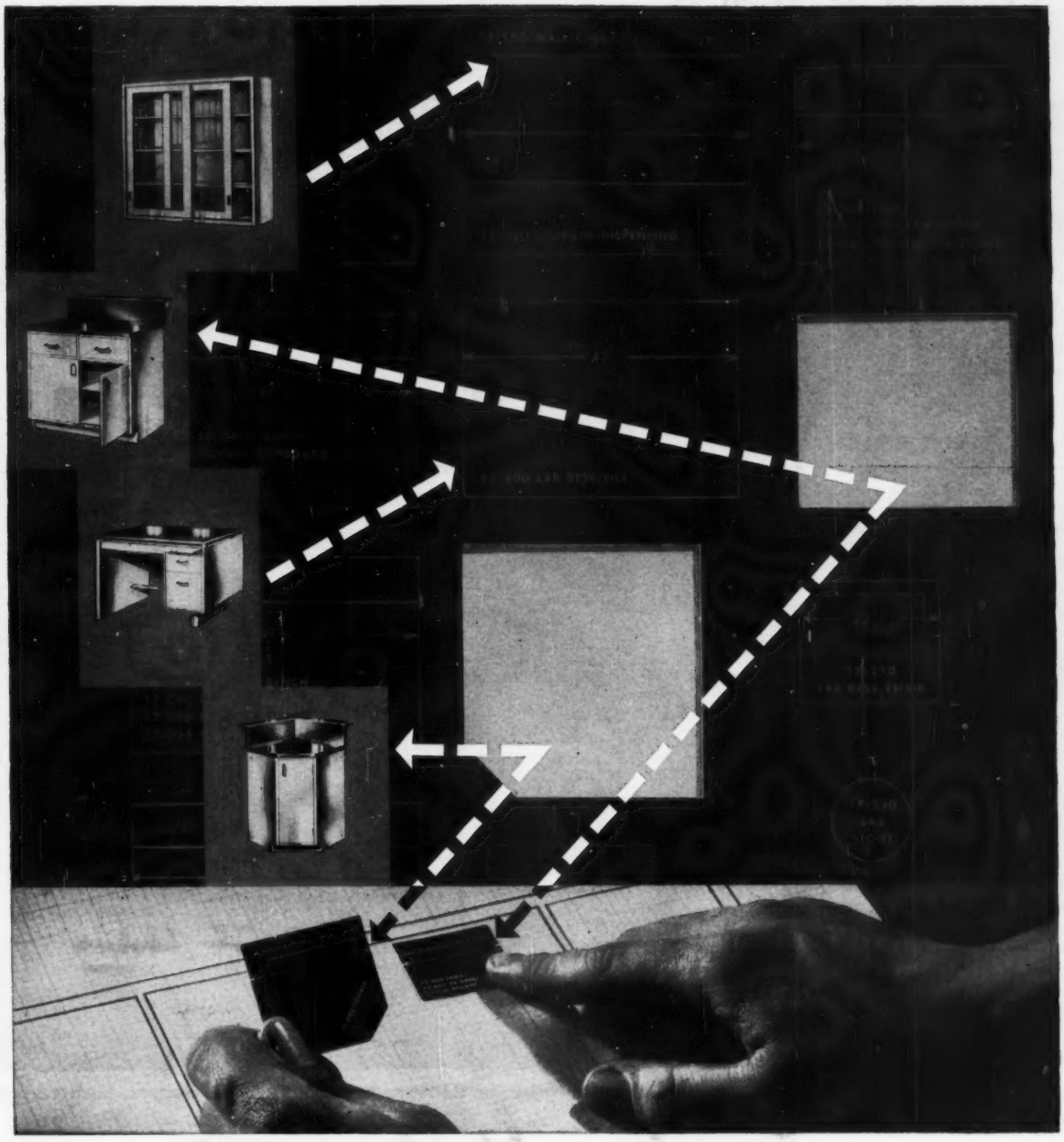
A new duplicating paper using plastic and solvent has been brought out by Columbia Ribbon & Carbon Manufacturing Co., Inc., (Glen Cove, N. Y.). It resembles carbon paper, but only in appearance. The new paper, called Plastisol, inks copies permanently, is smudgeproof and can be used about 60 times. Columbia estimates the new product may halve carbon paper costs for some users.

•

Nuclear waste from atomic-powered ships may be churned into the sea by the ship's propellers, according to Armour Research Foundation chemical engineers Richard Snow and Jan Rosinski. Their experiments, reported at this week's national meeting of the American Institute of Chemical Engineers in Atlantic City, show that the wastes are dispersed most quickly when released in front of the propeller. The ship's wake and natural sea currents also help do the job, but at a much slower rate.

•

A premium-grade gasoline that will cut air pollution by auto engine exhaust is planned by Tidewater Oil. Tidewater reportedly lowers the amounts of dicyclic aromatics in the gasoline by improved blendings, desulfurizing, reforming and redistilling. Smog-forming products are reduced 5-10%—not enough to eliminate smog even if all refiners adopted the method—but enough, the company feels, to help significantly. Reduced vapor pressure, routine for gasoline produced in summer months, is a year-round feature of the new gas, according to Tidewater.



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Cases of paper milk containers are loaded onto trucks for delivery to various retail outlets. Such cartons

Milk Carton Coatings—Major Wax Market Is

Polyethylene producers now concerned with a whopping overcapacity may well find something to cheer about within the next 12 months, for in that time the use of polyethylene-coated milk containers may prove to be a significant outlet for polyethylene.

Paper milk cartons (over 14 billion containers in '58) could take more than 200 million lbs./year of polyethylene, if a few technological and economical problems were licked. Here are some of the hurdles:

- Cutting costs of producing polyethylene-coated cartons, to make them competitive with wax.
- Convincing milk carton makers to switch to polyethylene.
- Only when these are cleared can poly overcome the toughest obstacle —knocking firmly entrenched wax out of the picture.

Now, paraffin wax is the major coating material for paper milk containers. It was used on more than 96% of the paper milk cartons produced in '58. The remaining 4% had plastic coatings; polyethylene in only a few cases. Polyethylene-coated milk cartons are more than "ivory tower" projects, however, and several dairies in the U.S. are now merchandising fluid milk in them.

Interest in polyethylene as a carton coater stems from some of the drawbacks of present wax coatings. Chief complaint—leaking containers. Leakers can be an expensive proposition to the dairyman even in the

U.S. PHOTO—JIM GAGNON

are currently a 500-million-lbs./year outlet for waxes, a possible big consumer of polyethylene.

New Target of Polyethylene Resin Producers

plant, because of the loss of both carton and contents. And when leakers reach the stores, there are lost sales, customer complaints, and replacement money to add to the bill.

Other shortcomings of wax: it flakes into the milk, scuffs off onto customers' clothing. Assessing customer dissatisfaction due to these factors is difficult. But dairymen recognize these undesirable properties of wax, and polyethylene producers emphasize that polyethylene-coated cartons are free of such drawbacks.

Unready Substitute? Before being able to offer a polyethylene-coated container, milk carton manufacturers must be able to supply the dairymen with both the polyethylene extruded paperboard, plus a machine that can handle the forming, assembling and sealing of the cartons. But so far leading producers in the wax carton field —Pure-Pak Division of Ex-Cell-O Machine Co. with 64% of the market and Canco Division of American Can Co. with 32% of sales—haven't offered suitable units.

Two of the smaller companies, however, now have machines for producing the polyethylene "bottles." These companies are the Sealright Division of Sealright-Oswego Falls Corp. and the Tetra-Pak Co., subsidiary of the Swedish concern, AB Tetra Pak-Lund.

Tetra-Pak Co. Inc.'s machine (first in the U.S.) is designed mainly for turning out a small (½ pt. or less),

tetrahedron-shaped container; it has found acceptance in schools, industrial establishments, army camps and other markets where economy is an important factor. Reason: the simplicity of the carton-forming operation permits poly-coated containers to be made cheaper than conventional wax-type cartons. But this is a very small outlet for paper milk carton.

Perhaps a development more significant to polyethylene producers, wax producers and carton manufacturers is the Sealright Division's polyethylene-coated quart container.

This carton is especially noteworthy because it is the favored size for sale through the wholesale milk market and through grocery stores and supermarkets, where there is no bottle-return consideration.

Sealright is not new in the plastic coated milk-container field, and has marketed products lined with various plastics for several years. Its experience and position in the field of plastic-coated milk containers affords it a definite advantage in marketing the poly-coated product. Instead of installing new machines, Sealright can simply convert its existing equipment at minimum cost. But the company is small in the field, accounts for only about 3½% of total milk carton sales.

This volume, though small, could be enough for a pretty decisive "popularity test" among consumers. Whether it will demonstrate that the important technological and economic problems have been licked, however, is another matter, because polyethylene still has several drawbacks, according to most package experts.

Cost Hurdle: Primary problem is an economic one. Polyethylene, at 38¢/lb., is competing with fully refined paraffin wax at 8¢/lb. Although polyethylene boosters are quick to point out that only half as much polyethylene is required, the wax costs are still very much less. Possible price reductions over the next few years could bring the price somewhat more in line.

Part of the economic problem is scrap loss. In the production of conventional wax milk cartons, paperboard is cut, formed and then coated with wax. In the case of polyethylene units, paperboard is first treated with the resin, then fed into machines, cut and assembled into a milk container. The resulting losses are more expensive because polyethylene coating on scrap board can't be reclaimed. Methods of overcoming this problem are now under research.

Then there is the matter of toxicity. The Food and Drug Administration is taking a long look at polyethylene coatings. Under the new food additive law, FDA approval is needed if the packaging material might become part of the food product—thus becoming an additive. The basic question: Does polyethylene become part of the food products it wraps?

Although it has not been proved definitely, there are indications that polyethylene may be absorbed by some oily products—and that may include milk. So far, no company has received FDA approval for the use of polyethylene on food packs. But manufacturers have until March, 1960 to meet the requirements of the law.

Fabricating Stickers: Technology problems are also involved in producing a high-grade carton, problems unique to polyethylene-coated containers.

For example, since the paperboard is precoated with the resin, and then fed into the forming machine, the

New Paper Pitch: Throwaway Tents

Disposable paper tents — designed primarily for military use, but to be introduced this spring as a sales gimmick by Ford automobile dealers—could open sizable markets for several chemical products.

The tent was designed under government contract by William Moss (Ann Arbor, Mich.). It utilizes Kimberly-Clark's newly developed paper made of a web of textile fiber (nylon) bonded with vinyl resin adhesive between two layers of cellulosic wadding. It is fireproofed with ammonium sulfamate made water-repellent with Metro-Atlantic's Atcodri Z (a zirconium-based emulsion). Nylon threads account for 5.8% of fabric weight.

A retail kit, designed for four campers, includes four sleeping bags, two tents and tarpaulin, and is priced at "less than $60."

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The reaction characteristics of Airco vinyl acetate monomer are consistent because its high purity is consistent. Every shipment of Airco vinyl acetate monomer is carefully pretested for its speed of reaction. This guarantees consistent reaction characteristics from lot to lot.

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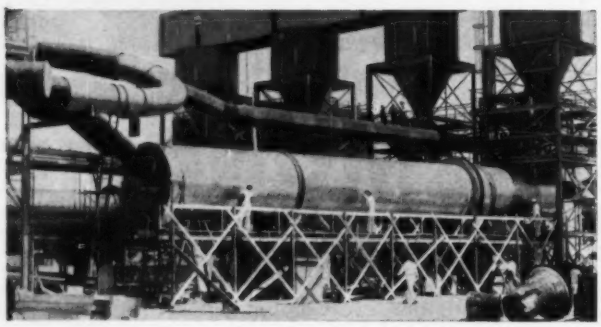

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CHEMICAL PROCESSING EQUIPMENT

Two Standard rotary calciners are now in operation at U. S. Borax's new refinery at Boron, Calif. These large, modern calciners, one stainless steel-clad, were job-engineered and built by Standard Steel.

If you have a processing problem, why don't you, too, call upon Standard's 57 years of rotary processing experience?

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General Offices & Plant, 5010 Boyle Avenue, Los Angeles 58, California
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package must be sterilized before filling. This is not necessary with wax, because the molten wax applied just before filling is hot enough to ensure sterility.

Various sterilization methods, such as installation of gas or electrical heaters, or the use of boiling water or chemicals, are being tried with the plastic-coated cartons.

Heat sealing poses another hurdle. High temperatures must be used to obtain good seals of the poly-coated containers. If a carton jams, the hot sealing unit sears the carton, could even cause fire.

Speed of the filling machine is an important consideration to the dairyman. At present, a wax carton machine can fill 75 quart cartons/minute; current poly carton machines have only a 60-unit/minute speed.

Pure-Pak is approaching the problems from several directions. Since it has over 34,000 wax machines leased to dairymen throughout the U.S., it is also working closely with wax suppliers to develop new formulations that will overcome the present drawbacks of waxes. However, recognizing that the new package is a definite threat, the company has started research studies on a polyethylene package at its own labs and in cooperation with the University of Michigan.

While the company is investigating the feasibility of converting existing equipment, it is also designing a machine to handle polyethylene only. So far, the one machine it has shown off is a standard wax machine modified to handle the polyethylene resin.

American Can is also studying the newer type of cartons at its research stations.

Wax Research: Even if the major problems are solved, can polyethylene wrest the big market from wax? In '58, about 500 million lbs. of wax was needed for fluid milk cartons. Wax producers, closely watching the inroads made by polyethylene, will be countering by trying to work out better wax coatings. And, even if polyethylene were to become a favored material, there would always be some dairies that—for reasons of economy or preference—would stick by wax.

The real test of polyethylene-coated milk cartons will come during the next 12-18 months, as more resin-treated cartons are field-tested.

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To help you choose the best solvent system to strike the ideal balance between cost and performance in your formulations, send for the handy 6-page "Solvent Selector." It gives information on all glycol-ethers and 32 other solvents. Write . . . Dept. HC, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y.

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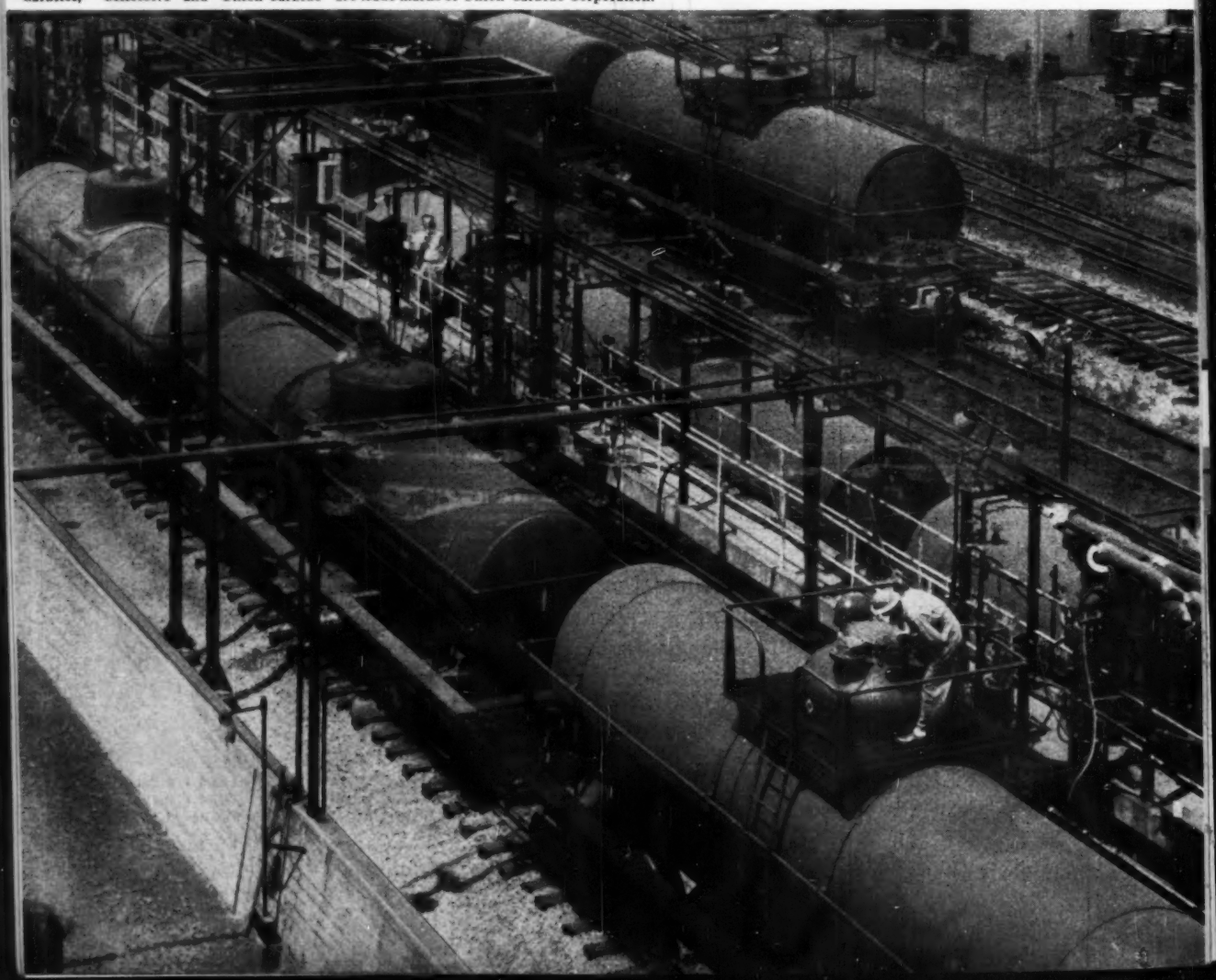
"Carbitol," "Cellosolve" and "Union Carbide" are trade-marks of Union Carbide Corporation.



Market Newsletter

CHEMICAL WEEK
March 21, 1959

Heptachlor pesticide is under fire by Southern farmers who—in collaboration with the U.S. Department of Agriculture's mass spraying program—have been using the chemical to fight the South's fire-ant scourge (*CW, Feb. 8, p. 97*). Louisiana sugar-cane fields treated with heptachlor, it's claimed, show 27.81% greater infestation by the sugar cane borer than is found in untreated fields. Reason: the pest's natural enemies are killed off by the heptachlor. The farmers' complaints are borne out by two independent surveys: one by the U.S. Department of Agriculture, the other by a Louisiana State University research group.

Several state and university groups will study the charges further. If their findings further corroborate the current charge, a special committee—headed by Louisiana Agricultural Extension entomologist Kirby Cockerham and including Antoine Dalfrey, state supervisor of the fire-ant program—will likely push for these corrective measures: declare affected cane farms emergency areas and provide funds for a borer control program; provide restitution for current and future losses incurred through use of heptachlor; study the residual effect of heptachlor for at least a three-year period.

Spokesmen for the pesticide industry admit that the government's fire-ant program is already in trouble, and the experience of the Louisiana farmers provides opponents of mass spraying programs with the kind of ammunition they seek. If the fire-ant program experiences a setback, it will obviously mean cutbacks in heptachlor demand and, perhaps, catalyze similar curtailments of other spray programs that use other types of pesticides.

•

Pentaerythritol prices are boosted this week because methanol costs have increased (*CW Market Newsletter, March 7*) and production costs are rising. These new quotes, effective immediately on spot orders and April 1 on contracts, are posted for truckload quantities by Heyden Newport: technical PE, 31¢/lb., up 1.5¢; monopentaerythritol, 31¢/lb., up 1¢; dipentaerythritol and tripentaerythritol, 40¢/lb., up 2¢; powdered technical PE, 32¢/lb., up ½¢/lb.

All prices are on delivered basis east of the Rocky Mountains; for shipments to the West Coast, a 1¢/lb. increase will be made. Other PE producers quickly boosted prices, gave the same reasons.

•

Hiked by Heyden Newport are tabs on technical benzaldehyde. Effective April 1, a 4¢/lb. increase sets carload and truckload prices at 47¢/lb. and l.c.l. lots at 48¢/lb. Tanktruck lots will be increased to 46¢/lb. Prices of benzaldehyde, N. F., are unaffected.

•

A 6% price increase on a mixture of calcined potassium, rubidium and cesium carbonate—tradenamed Alkarb—is posted by American

Potash & Chemical. The $7.50/ton hike, effective April 1 (f.o.b., San Antonio, Tex.; freight equalized with Syracuse and Niagara Falls, N. Y.) sets the new tab at $132.50/ton in contract carloads, minimum 30 tons, hopper-bottom cars. The increase reflects "over-all increases in costs and additional plant investment since the plant was first put into operation two years ago."

•

A 15% price cut on Salk polio vaccine, initiated last week by Parke, Davis and quickly followed by other producers, drops cost to $7.24/9 cubic centimeters (from $8.50).

It is the seventh cut since vaccine production began just three years ago. Vaccine supplies are more than adequate and the public has increasingly shown apathy about seeking inoculations—despite medical reports indicating a new upsurge in polio incidence in '59.

Pfizer will put a reportedly more effective vaccine on the market this spring (*also see p. 103*). And probable buyer preference for forthcoming oral products, when they become available, could leave dealer shelves filled with the older-type vaccine; these factors, too, probably influence producers' current attempts to move existing vaccine by cutting prices.

•

Canada's spanking-new potash industry will mark its entry into North American fertilizer markets soon by sending its first trainload across the border into the U.S. The shipment, from Potash Co. of America's $20-million mine at Patience Lake, Sask., underscores previous expectations that the U.S. Midwest would be a prime target of Canadian potash marketers (*CW, July 13, '57, p. 69*).

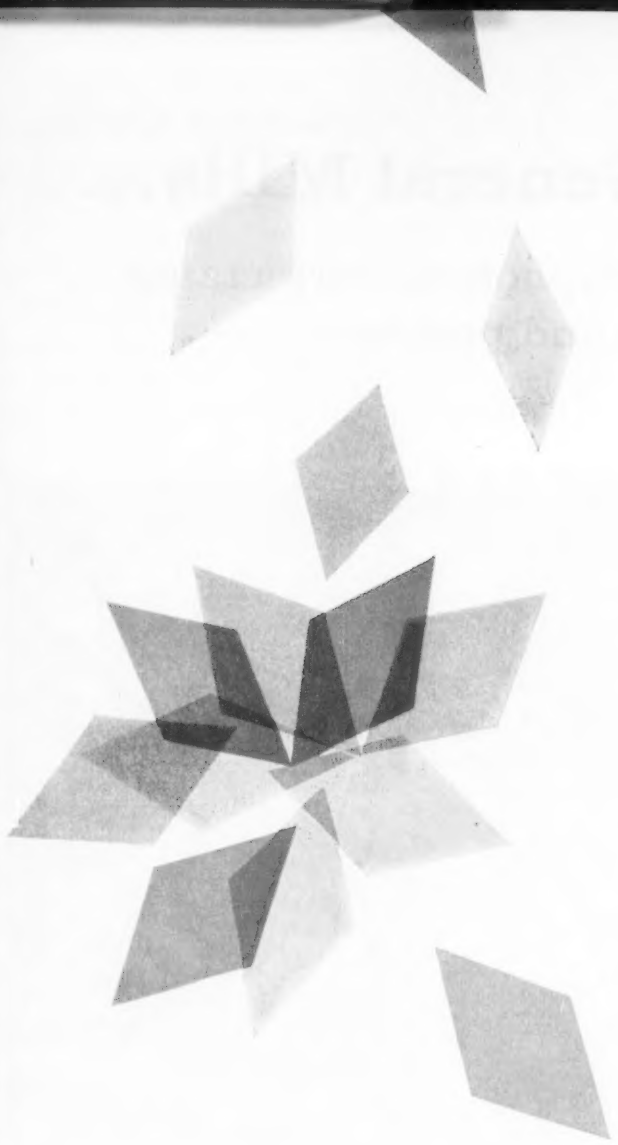
•

Ammonium nitrate fertilizer schussed into the ski market this winter. Operators of the Chalet Cochand in Canada's Laurentians scatter the chemical on sun-softened ski slopes to harden the snow, thereby extend the skiing season by several weeks. Bonus: subsequent fertilization of the slopes strengthens grass and provides an improved surface to hold the next year's snow.

SELECTED PRICE CHANGES — WEEK ENDING MARCH 16, 1959

	Change	New Price
UP		
Corn oil, crude, tanks, works	$0.0025	$0.113750
Palm oil, clarif., tanks	0.0025	0.1210
DOWN		
Stannic oxide, dms., dlvd.	$0.01	$1.11
Tung oil, dms., c.l., N.Y.	0.0025	0.2325
Cocoa butter, bgs.	0.02	0.75
Oleo oil, extra, dms.	0.005	0.15

All prices per pound unless quantity is quoted.



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amides,
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and many other
acid derivatives.

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carload,
less carload.

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Isovaleroyl Chloride
Lauroyl Chloride
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetyl Chloride
Propionyl Chloride
Sebacoyl Chloride
Stearoyl Chloride
and
others, made to order

Send *for new booklet which describes our operation*

1932

THE TRUBEK LABORATORIES

East Rutherford, New Jersey

NEW from General Mills...

DERIPHATS®—the amphoteric surfactants that **clean, condition** and **protect**— at the same time!

In the photograph above, enlarged 40 diameters, DERIPHATS are working as a shampoo ingredient. Their amphoteric nature—both cationic and anionic function—gives shampoo formulations controlled substantivity and detergency. Yet this is only one of countless applications where DERIPHATS, with their unique behavior, can offer cosmetic and industrial detergent formulators a more *versatile* cleaning agent.

Here's what DERIPHAT **amphoterism** is...

Acidic Media	Neutral Media	Basic Media
$RNH_2^+CH_2CH_2COOH$	$RNH_2^+CH_2CH_2COO^-$	$RNHCH_2CH_2COO^-$
cationic properties	amphoteric properties	anionic properties

Here's what **Deriphats** are...

DERIPHATS are N-substituted fatty amino acid derivatives. These fatty-based amphoteric surfactants contain both cationic and anionic functionality. This dual nature provides a single surfactant operative in both acidic and alkaline media. DERIPHATS are compatible with cationic, nonionic and anionic surfactants over a broad range. They produce abundant, lasting foam, are effective wetting agents, and retain their surface activity in concentrated alkalies and brines. The DERIPHATS exhibit excellent corrosion-inhibiting properties and detergency.

These and other unique properties make DERIPHATS well worth considering in your product and process development program. They are now, for the first time, available in commercial quantity—you can be among the first to use DERIPHATS to improve your formulations. Like all our chemicals, DERIPHATS never vary in quality—order after order.

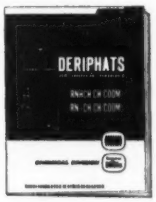
Which DERIPHAT property is most important to you?

- ☑ Compatibility with cationics and anionics
- ☑ Excellent detergency
- ☑ High foaming
- ☑ Excellent wetting
- ☑ Substantively adsorbed on skin and hair
- ☑ Corrosion-inhibition
- ☑ Anti-static agent
- ☑ Hard-water stability
- ☑ Good hydrotropic properties

Specifications: DERIPHATS

CHEMICAL PROPERTIES			PHYSICAL PROPERTIES				SPECIFICATIONS		
Product	general chemical structure (a)	chemical description	approx. equivalent weight	physical form	viscosity	specific gravity	per cent active	pH (b)	color, 10% active (c)
170C	$RNHCH_2CH_2COOM$	N-lauryl β-amino-propionic acid	251	viscous liquid	2500-3500 cps	0.98	50% min.	6-7	min. 80% T
160C	$RN(CH_2CH_2COOM)_2$	partial sodium salt of N-lauryl β-iminodipropionate	174	liquid	30-50 cps	1.04	30% min.	7-8	min. 80% T
154	$RN(CH_2CH_2COONa)_2$	disodium N-tallow β-iminodipropionate	232	flake	—	—	96% min.	11-13	min. 20% T
151	$RNHCH_2CH_2COONa$	sodium N-coco β-aminopropionate	276	flake	—	—	96% min.	11-13	min. 40% T

(a) M=sodium and/or hydrogen. (b) glass electrode, 1% active in water. (c) Coleman Jr. Spectrophotometer, % Transmission at 425 millimicrons.



WORTH SENDING FOR! New booklet gives you all the facts about this promising chemical. For a copy, address—Chemical Division, General Mills, Department 222, Kankakee, Illinois.

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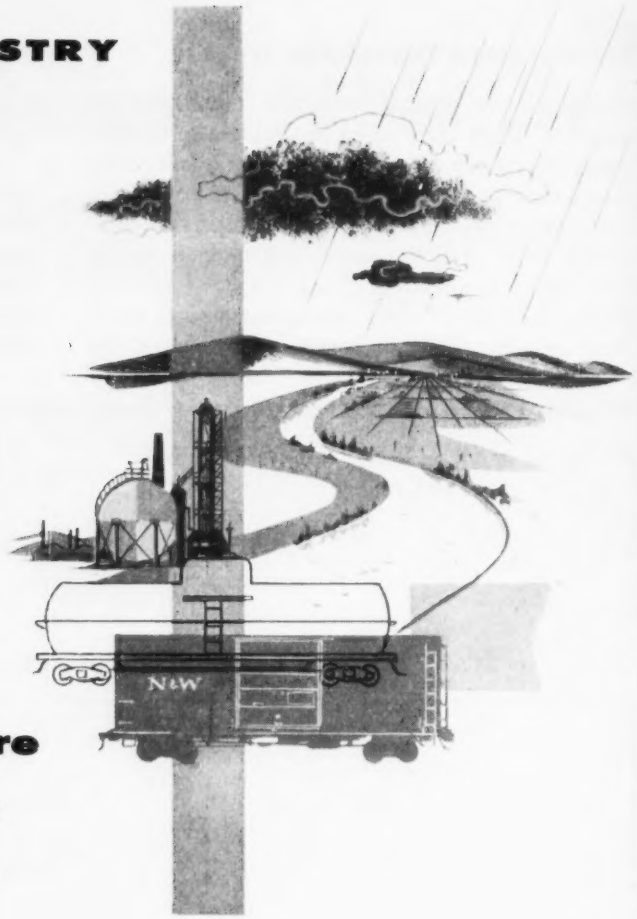
WATER FOR INDUSTRY



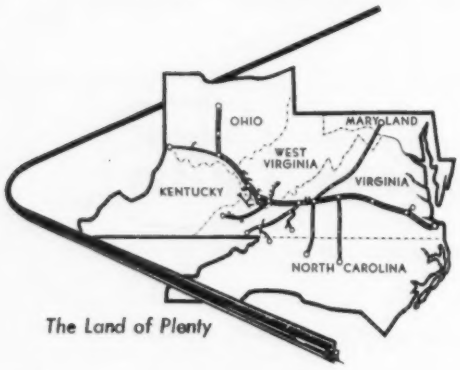
of the nation's 51 principal rivers, 6 flow in the Land of Plenty — where rainfall is 30% above the national average

The Ohio, James, New, Roanoke, Scioto, and Potomac Rivers — 6 of the 51 large enough to be classified as principal U. S. Rivers by *Statistical Abstract of the United States* — furnish good industrial water to many large, medium and small industries in *The Land of Plenty*.

In addition, rivers of secondary size used by industry include the Elizabeth, Nansemond, Appomattox, Dan, Bannister, Pigg, Smith, Shenandoah, Bluestone, Mayo, Holston, Big Sandy and others. In fact, in *The Land of Plenty*, there are 6000 sq. miles of inland surface waters.

U. S. Weather Bureau figures show rainfall in *The Land of Plenty* to be about 30% above the national average. The U. S. annual rainfall averages 31-36 inches, while that of *The Land of Plenty* is 40-45 inches. And not one of the six states in this region has a lower annual rainfall than the national average.

Let Norfolk and Western plant location specialists tell you about water and other industrial advantages in *The Land of Plenty*. There's no obligation, and all inquiries are kept confidential.



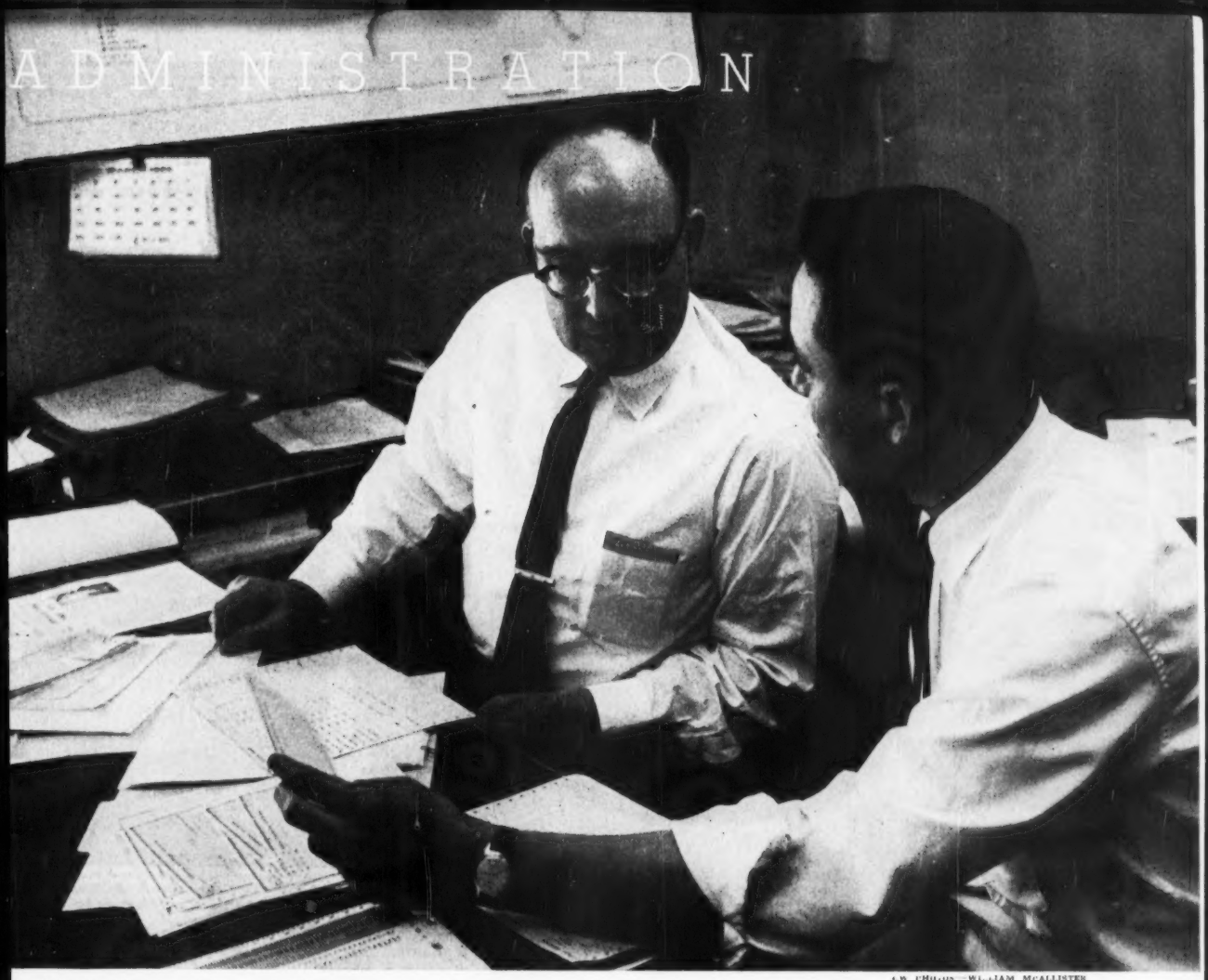
The Land of Plenty

Write, Wire or Call:

L. E. Ward, Jr., Manager
Industrial and Agricultural Dept.
Drawer CW-828 (Phone DIamond 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia

Norfolk and Western RAILWAY

For quick, competent assistance on shipping problems — talk with the N&W freight traffic Sales and Service representative nearest you . . . in one of 39 key cities across the U. S.



CW PHOTOS—WILLIAM MCALLISTER

Allied's Moore (left) and Mistretta plan for company-wide application of Teletype payroll system.

Putting the Payroll on a National Hookup

Mounting administrative costs are still a primary target for budget-minded chemical process industries executives. Case-in-point: top management men at Allied Chemical last week were preparing to adopt, on a corporation basis, a Teletype payroll system (see cuts) that is already saving Allied's General Chemical Division three man-days per 100 employees per week.

The system, enthusiastically states Robert Moore, General Chemical's manager of systems and automation, is a "major timesaver, an efficient, practically foolproof way to disburse wages and salaries and maintain payroll records."

The Teletype payroll system utilizes the division's previously installed data-processing communications network. This network had been set up to relay sales and purchasing information between the home office in New York and seven plants in four states (*CW, Sept. 3, '55, p. 44*).

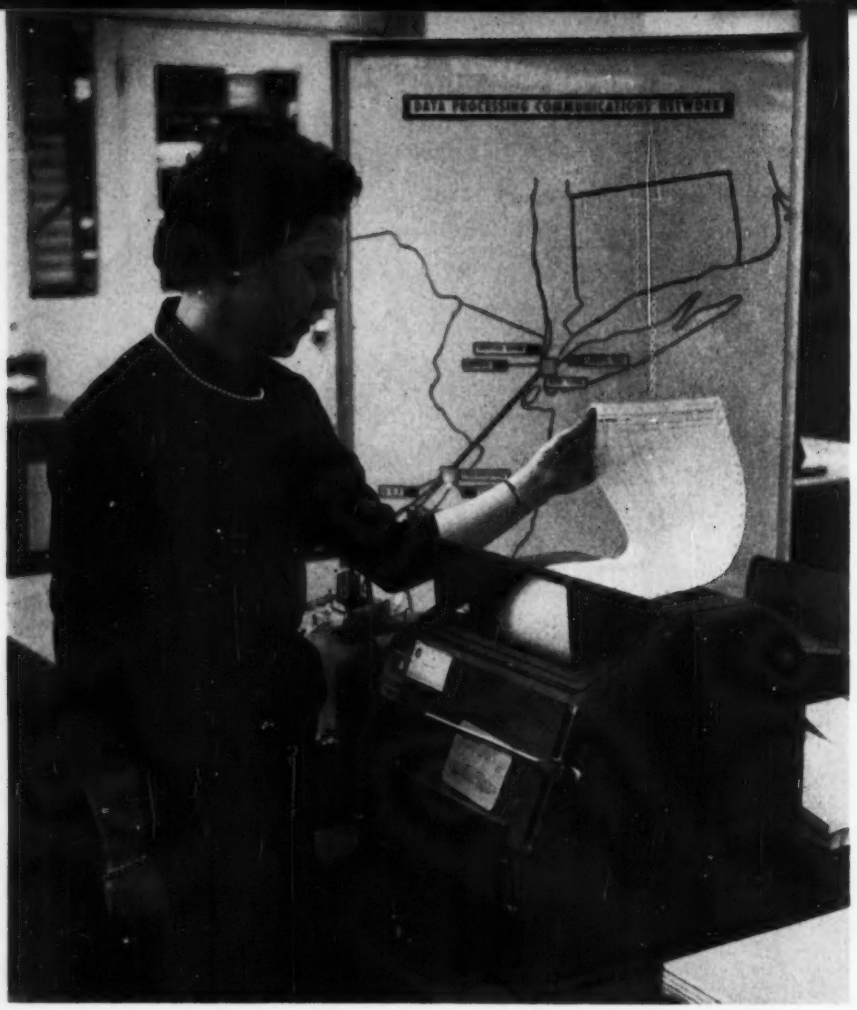
Here's how the system has been adapted for payroll processing: Time-clock cards are collected in each plant at the end of the pay period, transmitted via Teletype to the home office. Teletyped information includes the employee's initials, clock number, department, type hours (overtime, regular, etc.), hours worked and wage rate. As the information is received at the office, it is simultaneously punched on a tape, which is subsequently fed into a tape-to-card converter to produce a punched card for each employee.

Employees' cards are fed into an IBM Model 650 electronic computer, along with cards indicating each employee's payroll-record-to-date. Operating at the rate of 100 employees every two and one-half minutes, the computer figures the employee's wages for the period under consideration. A new record-to-date is also made.

Return Trip: Cards indicating wages to be paid are next fed into a card-to-tape converter, producing a five-channel punched paper tape for transmission back to the plants via Teletype. The receiver at each plant prints the payroll information directly onto an IBM punched-card check. The check is designed to eliminate the use of carbon paper—the earnings statement, a 2¾x3½-in. slip, is attached, overlapping a portion of the check where normally only printed matter

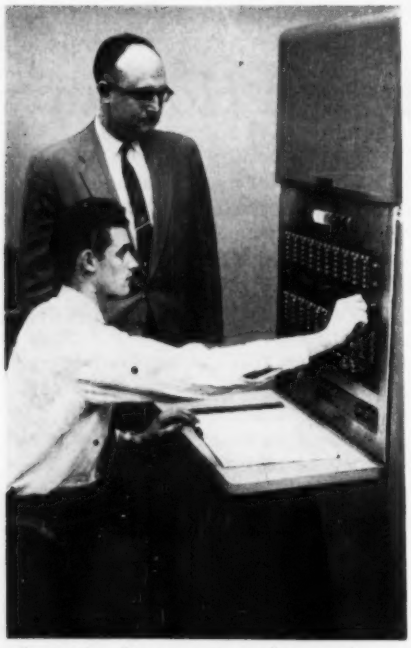
ADMINISTRATION

How Allied's Teletype payroll system works

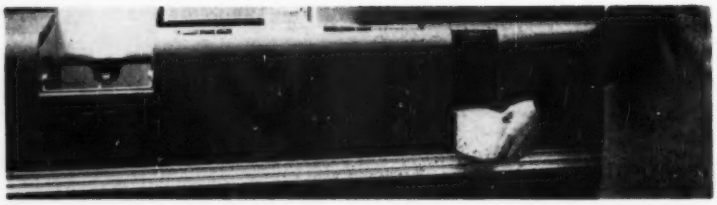


Main office Teletypewriter receives payroll data from firm's scattered plants.

Tape-to-card converter puts data on punched cards, which are fed into IBM Model 650 computer.



Computer figures wages due employees at rate of 100 every three minutes.



Punched cards are taken from computer, fed into card-to-tape converter.

Tape from converter goes onto Teletypewriter, which transmits to plants.

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TOXAPHENE is now officially accepted for registration as a toxicant in aerosol space sprays and non-pressurized space sprays. This development brings to the householder the benefits of an outstanding insecticidal material which has served farmers so well for a decade.

The use of toxaphene as a killing agent in your formulations can result in substantial savings. In addition to its superior performance against the common household pests, toxaphene is highly effective as a mothproofing material.

Toxaphene provides excellent control of flies, mosquitoes, gnats, ants, silverfish, bedbugs, roaches, house spiders, black carpet beetles, clothes moths, fleas, many small flying insects, and other pests which invade homes and business establishments.

To learn how toxaphene can lower your costs and improve your formulations, contact your nearest Hercules sales office.

SOME ADVANTAGES OF TOXAPHENE

- ***Long residual biological activity***
- ***Needs no auxiliary aromatic solvent***
- ***Compatible with common toxicants or knockdown agents***
- ***Pleasant piney odor***
- ***Does not discolor treated surfaces***
- ***Economical to formulate***
- ***Relatively low toxicity to warm-blooded animals at concentrations used***

Agricultural Chemicals Division
Wilmington 99, Delaware

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NX58-8

appears. Information appearing on the employee's detachable earnings statement, therefore, does not appear on the check itself.

Each plant's accountant is responsible for verifying the check against the clock cards. He checks hours, gross and net pay against control totals transmitted from the main office. Payroll checks are then signed and distributed.

Banks Cooperate: An added advantage of the system, said Sandy Mistretta, General Chemical automation specialist, is the check reconciliation operation. Within four working days, the bank is able to tell the division the status of its account through the use of a punched earnings card forwarded to the bank after completion of the payroll.

Fast transmission, simplified bank reconciliation, utilization of a central computer, reduction of bank balances through use of a central bank are a few of the advantages that have induced Allied to expand the Teletype payroll system to include some 2,000 employees in 20 plants.

Moore, with obvious pride, told *CW* that the payroll system gave rise to few complaints, but that certain features of the system could be improved.

"Transmission, for example, is slow, only 60 words/minute. If this could be speeded up, we could process payroll data much faster," Moore said.

Since check numbers are also transmitted, there is always the possibility that a number might be typed incorrectly, which would throw the entire numbering sequence off, Moore added. The same thing would happen if a check were spoiled during transmission, he said.

General Chemical, and a half-dozen or so other CPI firms, found that adapting their electronic sales-purchasing data-processing systems to payroll transmission called for only slight modification.

Establishing the sales and purchasing system alone is expensive, since rental fees alone for equipment and Teletype network may be as high as $7,500/month. But when the system can be put to multiple uses, as is usually the case, it can actually be a money-saver.

Clearly, automation of administrative functions is destined to be steadily increased.

NOTE: To do the most effective job of publicity and promotion for Chemical Progress Week and the Drug and Chemical Industries Activities Committee, we need your help by returning this questionnaire to us no later than Thursday, Feb. 26. Thanks for your cooperation.

If you have a public relations director, what is his name and address?

Would you like to have Miss Chemistry visit your plant for a publicity stunt before Chemical Progress Week?

Do you know of any recent developments in the chemical industry that would be of interest to newspaper and magazine editors (e.g., medical, fashion, food or industrial)?

How long has your plant been in the community and what is its proportionate role in the economy?

Do you have any unique or educational demonstrations or films that would be suitable for television, radio, classrooms or service groups? If so, please list type and length.

Would you allow students to work under supervision in your laboratories for a one-day demonstration?

Prefactory note and sample questions mailed by Chicago group.

Telling the CPI Story

It was apparent last week that initial efforts of the chemical process industries' newest promotional group—the Drug and Chemical Industries' Activities Committee of Illinois—were meeting with success.

On the one hand was the record of a near-100% reply by Illinois drug and chemical firms to a detailed activities questionnaire (part of which is reprinted above); on the other, the just-completed high school editors press conference attended by 100 enthusiastic youngsters.

DCIAC says the questionnaire brought the committee a number of suggestions and offers of aid from respondents, including films, demonstrations and plant tours. Purpose of the questionnaire was to enlist company assistance in promoting the committee and Chemical Progress Week (April 13-18) as well as the industry.

The press conference was called specifically to announce Chemical Progress Week, but DCIAC told *CW* it was also designed to stimulate student editors to report to their classmates on career opportunities in the drug and chemical industries.

The students heard industry speakers, then quizzed a panel moderated by Victor Chemical's market research chief Scott Godron.

Future Plans: DCIAC outlined for *CW* its schedule of upcoming activities, an ambitious program carrying through to mid-October. Activities include: a high school newspaper editorial contest that will award a $50 U.S. savings bond to the writer of the editorial that best encourages students to enter the field of chemistry, best presents the need for future scientists; a Miss Illinois Chemistry contest to select a chemistry, chemical engineering, medicine or pharmacy major from one of the state's colleges to serve as queen of Chemical Progress Week; the annual kickoff luncheon April 13 to inaugurate Chemical Progress Week; radio and television programs; setting up a scholarship fund for two postgraduate students; an autumn high school guidance counselors luncheon; and, in mid-October, at student chemistry-career seminar.

Program goal: "To achieve a multifold improvement in the public's concept of the drug and chemical industries as it concerns the future of the state, nation, the children's careers and their daily lives."

POWELL

NICKEL and MONEL* VALVES

for Chemical and Process Industries

We have produced a wide line of NICKEL and MONEL* METAL VALVES. All are ready for immediate delivery!

When your flow control requirements call for Nickel or Monel* Metal Valves your local Powell Valve Distributor is the man to see. There's one located in all principal cities. Or write to us for complete information.

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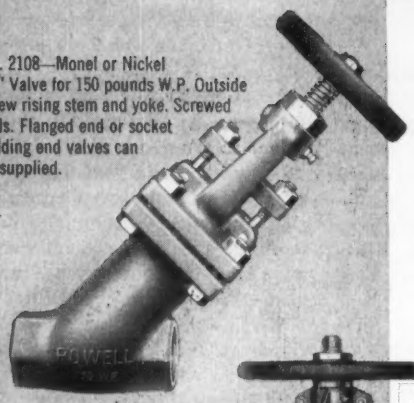

Fig. 2108—Monel or Nickel "Y" Valve for 150 pounds W.P. Outside screw rising stem and yoke. Screwed ends. Flanged end or socket welding end valves can be supplied.

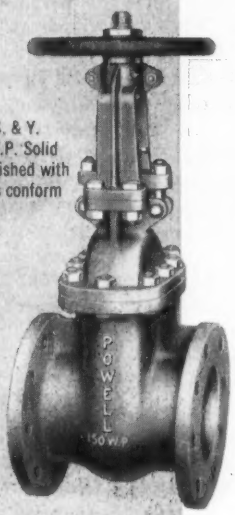

Fig. 2453 SG—Large size O.S. & Y. Gate Valve for 150 pounds W.P. Solid wedge disc. Can also be furnished with split wedge disc. Dimensions conform to latest standards.

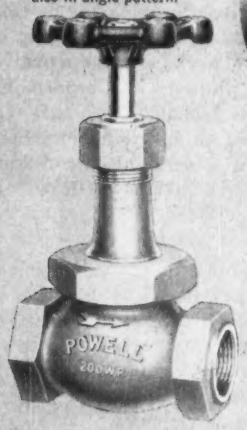

Fig. 1836—Monel Metal
Fig. 1839—Nickel
Small Union Bonnet Globe Valve for 200 pounds W.P. Available with screwed, flanged or welding ends; also in angle pattern.

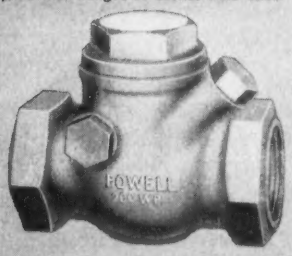

Fig. 1843—Monel Metal. Fig. 1845—Nickel. Small size Check Valve for 200 pounds W.P. Screwed-in cap. Has straightway flow area through valve body when disc is in wide open position. Can also be supplied with flanged or socket weld ends.

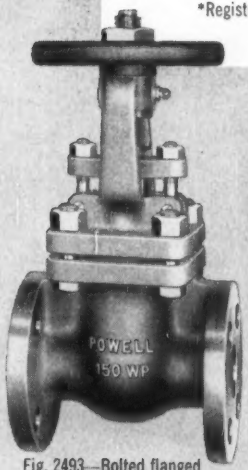

Fig. 2493—Bolted flanged bonnet Gate Valve for 150 pounds W.P. Outside screw stem rises through revolving bushing in upper yoke. Interchangeable solid or split wedge discs. Screwed or socket weld end valves also available.

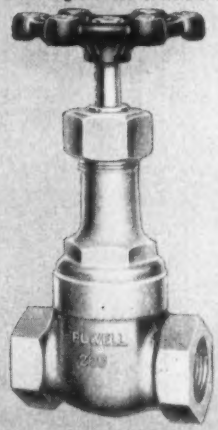

Fig. 1828—Monel Metal
Fig. 1830—Nickel Inside screw rising stem Gate Valve for 200 pounds W.P. Accurately guided solid wedge disc. Also available with flanged or socket weld ends.

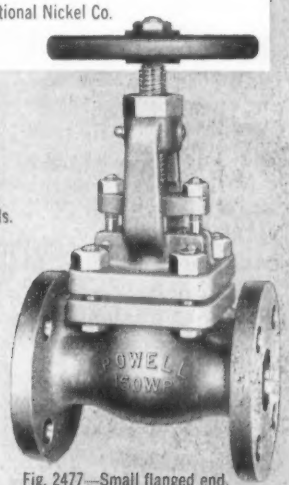

Fig. 2477—Small flanged end, outside screw rising stem and yoke Globe Valve for 150 pounds W.P. Bolted flanged bonnet. Can be furnished with screwed or socket weld ends. Angle Valves available.

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Labor Policy Set

Process industries management men and labor leaders last week had a clear-cut government position around which to build future management-labor relations. Labor Secretary James Mitchell spelled out the Administration's stand at the 33rd annual dinner of the Drug, Chemical and Allied Trades Section of the New York Board of Trade.

The Administration framed three specific proposals for better labor relations: (1) legislation should provide ground rules for labor's conduct, not restrict legitimate labor growth; (2) efforts to boost wage levels and standards of living should not price the U.S. out of foreign markets; (3) management and labor should work for a better personal relationship away from the bargaining table.

Mitchell told the 2,500 Board of Trade members that the aims of labor legislation should be to safeguard funds, protect the public, protect worker and employer from abuses of secondary boycott. It's up to management and labor, Mitchell said, to work out the details within the framework of ground rules provided by legislation.

World Trade Need: "We need world trade, we must compete," Mitchell said, "but we might very well price ourselves out of world markets. Many people maintain that high prices are the result of high wages. There are other factors, but . . . we must recognize that the objective of obtaining higher standards for workers must be conditioned by the fact that U.S. labor is competing with German, Belgian and Japanese labor. This doesn't mean we should be content with our standards—we must try to increase them—but we must be realistic."

Turning to the question of individual relationships, Mitchell asked, "When do you meet your workers or their representatives other than at the bargaining table? When do you discuss problems that concern both of you? It is conceivable that there's something to be gained by giving them your feelings. The essence of industrial relations is the relationship between you and the people who work for you, and between you and your employees' representatives."

WIDE WORLD

Mitchell: He set the Administration's guides to labor-management relations.

Theory of Management

Ten basic concepts in the development of industrial managers were offered this week at a meeting of American Institute of Chemical Engineers at Atlantic City, N.J. The rules, based on an extensive research study of a General Electric training program, were offered by Moorhead Wright, consultant to GE's advanced management course.

The 10 rules, called "useful guides, not eternal verities" by Wright:

(1) Avoid overstandardization. The development process is a highly individual matter.

(2) A man's development in business is self-development.

(3) Specific personality characteristics should not be considered as prerequisites to management positions.

(4) A man's development results 90% from day-to-day experiences, 10% from education, company courses, rotation, etc.

(5) Development opportunity must not discriminate between "promising" and "unpromising" men.

(6) Primary emphasis should be placed on development in the present assignment, rather than on the promotional ladder.

(7) Managing is a separate and distinct kind of work, a profession.

(8) Decentralization of decision-

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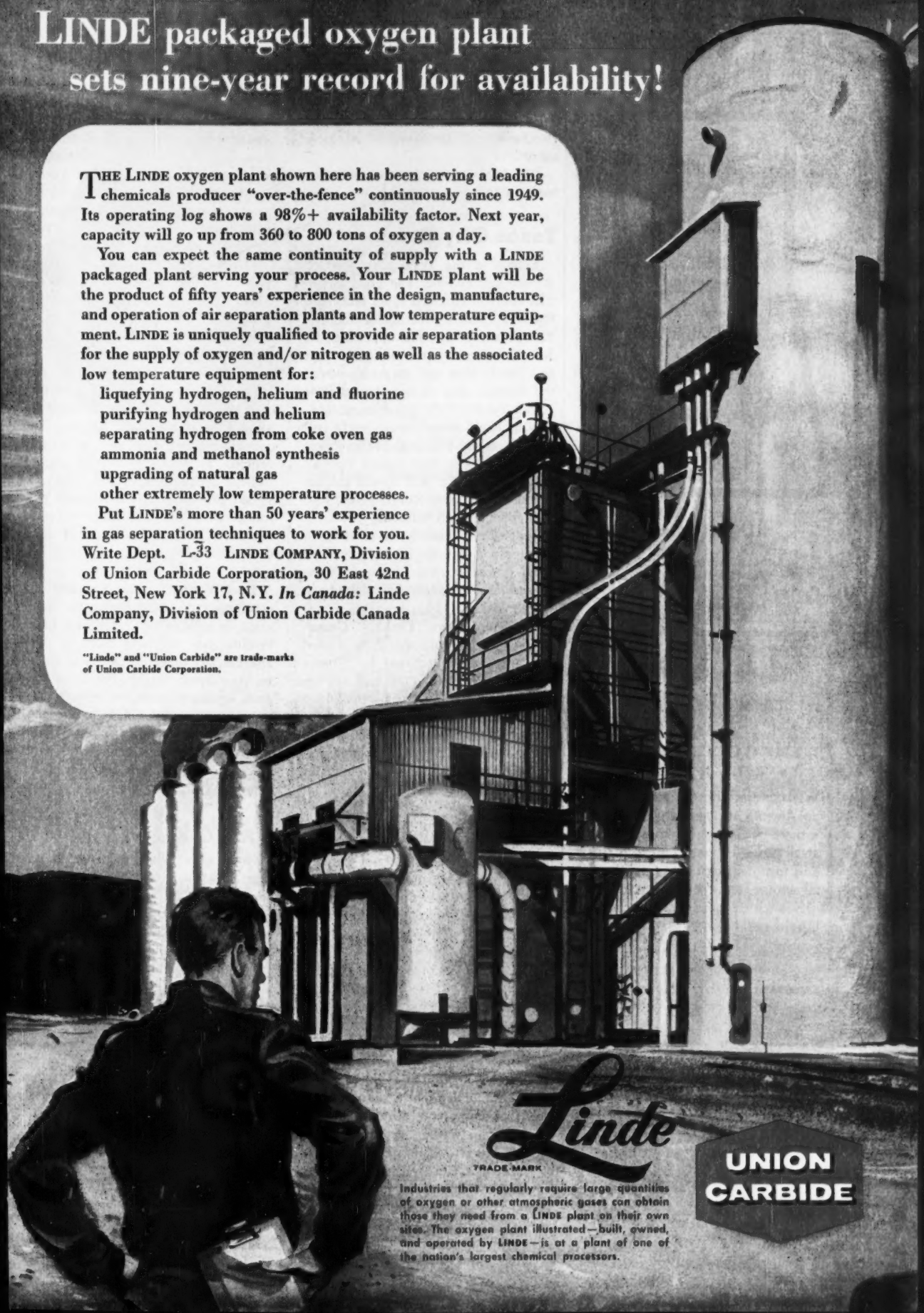

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making is a prime instrument of development.

(9) Line managers at all levels are responsible for development of their subordinates.

(10) Moral and spiritual values are basic in the development process.

Texas City Echo

Echoes of the Texas City blast of '47 are still audible. The Federal district court in Houston ruled last week that the French government and the French steamship line operating the *S.S. Grandcamp* (the freighter that was first to blow up) are to blame for the disaster. And though the ruling is a victory for U.S. government lawyers, it likely doesn't mean early collection of the $70 million in claims against France—that nation has already indicated it will appeal the decision to the circuit court, perhaps go as high as the U.S. Supreme Court.

Judge Ben Connally, in refusing to exonerate either the French government or the French Line, said there was to be no limit to their liability in the explosion.

Shipboard Start: The *S.S. Grandcamp* was one of two ships loaded with fertilizer purchased by France under the Marshall Plan and tied up at Texas City. An explosion ripped the ships, set fires that raged in the city for three days. Nearly 600 people lost their lives, 3,500 were injured and property damage was estimated at $32.8 million (*CW, Oct. 12, '57, p. 84*).

U.S. Government Acts: After the U.S. Supreme Court ruled that the federal government was not responsible for damages caused by the explosion, Congress passed a relief act to compensate the injured and those who lost property. The government has paid out about $16.5 million in claims and in the current court proceedings is seeking $70 million in claims from the French. That figure, the U.S. government lawyers said, represents the face value of individual claims filed under the relief act.

Judge Connally said the French were legally chargeable with knowledge that ammonium nitrate, base for the fertilizer, was an oxidizing agent and a fire hazard. The evidence shows, he ruled, that the French were "careless and negligent" in taking safety precautions aboard the ship.

IDEAS

Pollution Approaches: Modern approaches to pollution control are covered in a new booklet published by American Cyanamid Co. (New York). The booklet presents papers delivered last year at the air-stream pollution-control seminar sponsored by the U.S. Public Health Service, the New Jersey Dept. of Health, Rutgers University and Cyanamid. Copies may be obtained from H. C. Levin, at Cyanamid.

•

Russian-Language Courses: A number of employees of Merck & Co., Ciba Pharmaceutical Products and Union Carbide Plastics Co., division of Union Carbide, are enrolled in basic Russian-language courses. The courses, presented as part of an off-campus program by Union Junior College (Cranford, N.J.), are designed primarily to aid research personnel in reading Russian technical reports. Courses are given at each company's plant.

•

Do-It-Yourself Office Layouts: Executives and office managers interested in efficient and pleasing office layouts may get help from a "do's and don't's" template card just issued by Remington Rand. The card suggests square footage for private, sectional and general offices, offers general rules for arranging desks and shows five recommended desk and office layouts. Cards are available from RR's branch offices.

LABOR

Goodyear's Fringe Benefits: Goodyear Tire & Rubber Co.'s Akron plant newspaper, *The Wingfoot Clan*, has concluded its series of six articles reviewing the firm's wages and benefits program. According to the just-published final article, Goodyear spends for fringe benefits almost double the U.S. average per employee per year.

The company reports that its fringe-benefits program costs 84¢/hour per employee, $1,700/year for the average factory worker. This compares with 56¢/hour spent by the largest automobile company and an estimated 65¢/hour by the steel industry, the article said.

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State Labor Developments: Several developments generally favorable to

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ADMINISTRATION

organized labor occurred in key states recently. Among them:

• Arkansas Governor Orville Faubus vetoed a legislative bill that would have required labor unions to register with the state, make them liable to being sued in state courts. He said the measure was "unnecessary," would be "discriminatory" and would "impair good management-labor relations."

• Ohio's Governor Michael DiSalle has recommended legislation aimed at stamping out racketeering in labor-management relations. He called for a state ethical-practices code patterned after the AFL-CIO code. In another development in Ohio, a labor-backed bill to create a state labor relations commission was introduced in both houses of the legislature. Purpose would be to prevent unfair labor practices, encourage collective bargaining.

KEY CHANGES

Arthur L. Boschen to vice-president for finance, **Leslie W. Garner** to controller, Vick Chemical Co. (New York).

Fred A. Sabacek to president, Reproduction Products Co., subsidiary of General Aniline & Film Corp. (New York).

G. P. Oldham to vice-president in charge of marketing, Barrett Division, Allied Chemical Corp. (New York).

Reginald P. Perry to vice-president, Lukens Laboratories (Newton, Mass.) and its associate corporation, Skinner and Sherman Co.

Clinton B. Scoble to president, National Filter Media Corp. (New Haven, Conn.).

William D. O'Morrow to vice-president in charge of sales, Wasco Chemical Co. (Cambridge, Mass.).

Walter C. Meuly to director of research, Rhodia, Inc. (New York).

DIED

W. Howard Wright, 84, president, Schenectady Varnish Co. (Schenectady, N.Y.), at Schenectady.

Hugh F. Schimmelpfennig, proprietor, Ace Chemical Products Co. (Milwaukee, Wis.), at Milwaukee.

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Petrochemical Marketing Research. Opening for chemist or chemical engineer with marketing research or commercial analysis experience. Position is in maketing research section of a leading national company expanding in the petrochemical field. Excellent opportunity for future advancement in development, sales, operation, and administrative fields, as well as in marketing research. Location—Houston, Texas. Salary open, depending upon qualifications. Please send personal resume to: W. W. Clark, Continental Oil Company, P.O. Box 2197, Houston 1, Texas.

Chemical Sales Opening—Chicago—St. Louis Area. Experienced man with technical background preferred. Salary, expenses, car, benefits. Send resume to Sales Manager, Chemical Division, Tennessee Products & Chemical Corporation, P. O. Box 9, Nashville 2, Tennessee.

Production Superintendent—Bichromate, Qualified to take full charge of the operation of a new plant for the production of bi-chromate and chrome chemicals. Submit resume of education, past experience, and salary requirements. All replies held in strict Confidence. P-1177, Chemical Week.

Director Of Research—We are expanding our Research and Development activities, both at the corporate level and within operating divisions. To contribute constructive leadership for this expansion, we have created a new post—Corporate Director of Research. The executive appointed to this post will supervise directly our corporate research activities. As senior technical executive, he will report to the President, and will have membership on the Management Committee. He will, in addition, coordinate our divisional research and development programs. The man we are looking for has a proven record of obtaining financial return from investments in research administration as well as possessing high technical competence in resins and polymers, and related experience in printing inks, coatings or finishes. He must have capability in evaluating and budgeting research programs, in judging the technical potential of possible acquisitions, in appraisal and development of technical personnel, and in collaborating with divisional managers and technical directors. But his main strength lies in his proven ability to harness the technical programs of the company to its business objectives. Salary Open. Location, New York Metropolitan Area. Send Resume, in strict confidence, to: President, Sun Chemical Corporation, 750 Third Avenue, New York 17, New York.

Chemical Distributing Company Executive. Company in midwest is starting new chemical distributing corporation as diversification. Needs experienced and ambitious young man capable of operating it. Salary, stock option and bonuses. P-1209, Chemical Week.

Chemist or Chemical Engineer for research and development, metal processing lubricants, buffing and finishing compounds. Should have a good foundation in physical chemistry and experience with fats, oils, soaps and emulsions. Excellent opportunity. P.W. Soderberg, Bruce Products Corporation, Howell, Michigan.

Project Engineering Coordinator. A midwest chemical company desires to hire graduate chemical engineer with broad experience in project, design and process engineering in the petro-chemical field. Must have ability and experience in supervision and coordination of project activities including personnel involved. Our employees have been advised of this opening. Please send detailed résumé of personal data, experience, education and present salary to P-1222, Chemical Week.

POSITIONS WANTED

Manager Chem. Sales & Market Development 9 yrs. product and sales management. Dramatic results in expanding sales. Organized new chem. div. Have developed new national markets for variety of products. B.S.1939. PW-1072, Chemical Week.

Chemist: bright, ambitious, resourceful, seeks employer desiring same. Opportunity paramount. PW-1066, Chemical Week.

Manager chemical sales with strong market and sales development background, 6 years experience (formulations, tech. service, markets in cosmetic and industrial applications). Desires responsible position in same or related field. Free to travel and relocate, fluent in five languages, will consider export work. PW-1257, Chemical Week.

SELLING OPPORTUNITIES AVAILABLE

Salesmen Industrial Chemicals—Our growth company continues to need additional salesmen to sell Water Treating and Petroleum Treating chemicals in our rapidly expanding markets throughout the U.S.A. Good salary plus expenses, profit sharing, and excellent benefit program. Car furnished. On-the-job training program. Two years of college chemistry and a college degree desirable. Industrial Sales experience an asset. Mail resume to Personnel Dept., National Aluminate Corporation, 6214 W. 66th Place, Chicago 38, Illinois.

MANAGEMENT SERVICE

Robinette Research Laboratories, Inc. Industrial Research, Consultation, Technical and Economic Surveys. Product Development, Chemical Market Research. 16 East Lancaster Avenue, Ardmore, Pa. Tel. Midway 2-6457

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Want To Sell In The Growing Export Market? We are fully equipped to handle accounts on an exclusive basis, and invite inquiries from principals in the chemical industry. We are the Import/Export affiliate of Carlisle Chemical Works, Inc., Reading, Ohio, and its division, Advance Solvents & Chemical, New Brunswick, N.J. Our present principals include: Cadet Chemical Corp., Harry T. Campbell Sons' Corp., Cowles Chemical Co. (Heavy Chemical Department), John R. MacGregor Lead Co. and Titanium-Zirconium Co. If you are a manufacturer of raw materials or intermediates for the chemical process industries, and are looking for active, experienced representation in the export market, write to: Advance International Ltd. 245 Fifth Avenue, New York 16, N. Y., Telephone: Oregon 9-2663.

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Why not sell in the paper industry? Team of paper industry chemists and specialists will evaluate, at nominal cost, your products for specific applications. Should you desire not to handle sales, we have standing requests from major suppliers for products on a royalty or resale basis. SS-1190, Chemical Week.

FOR SALE

Allis-Chalmers 7' x 50' Rotary Dryer, Double shell, indirect-direct heat. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Oliver 5'3" Rotary Vacuum Filter, precoat, 25# pressure, T316 SS contact parts. Perry Equip. Corp., 1415 N. 6th St., Phila. 22, Pa.

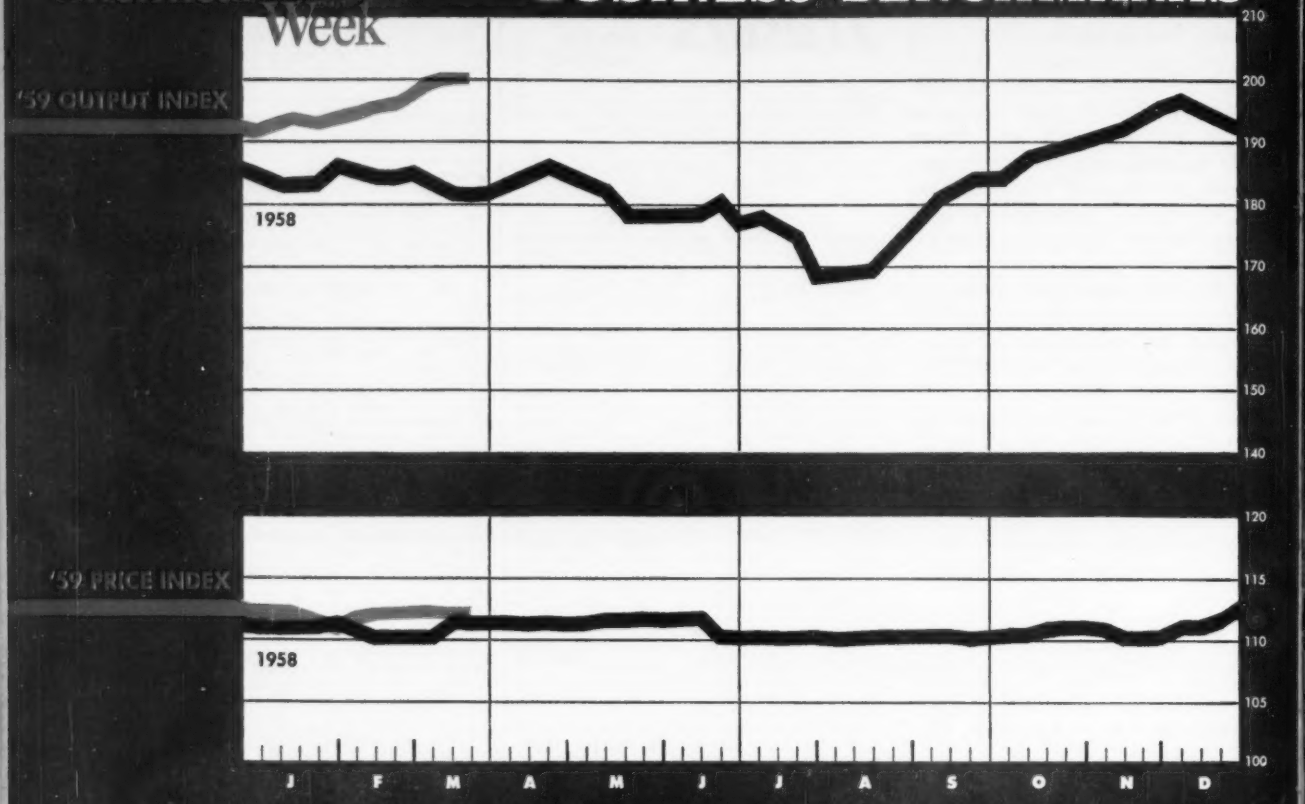
Reactor T347 S.S. New 4000 gal. jktd. 150# int. press. ASME. Used good cond. 1500 gal. Pfaudler glass lined agit. jktd. Reactor 50# int. press. 90# jkt. press. 15 HP XP motor. Located southwest. FS-1097, Chemical Week.

WANTED/FOR SALE

This Tracer Section can be used whenever you are looking for or offering Equipment, Plants, Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division, Chemical Week, P.O. Box 12, N. Y. 36, N. Y., LOngacre 4-3000.

Chemical Week

BUSINESS BENCHMARKS



MARCH 21, 1959

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-1949=100)	201.2	200.8	183.0
Chemical Week wholesale price index (1947=100)	112.0	112.0	110.9
Stock price index (11 firms, Standard & Poor's)	53.57	52.92	40.48
Steel ingot output (thousand tons)	2,600	2,556	1,463
Electric power (million kilowatt-hours)	12,945	12,972	11,793
Crude oil and condensate (daily av., thousand bbls.)	7,213	7,199	6,328

MONTHLY INDICATORS—Foreign Trade (million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	113.5	117.9	110.6	25.4	22.1	26.1
Coal-tar products	7.7	9.3	9.4	4.3	4.9	5.5
Industrial chemicals	18.0	18.0	15.0	9.1	8.6	8.1
Medicinals and pharmaceuticals	23.7	22.9	26.1	1.5	1.5	1.5
Fertilizers and materials	8.7	9.2	8.5	8.0	4.9	8.8
Vegetable oils and fat (inedible)	4.3	4.2	9.5	7.0	5.4	7.3

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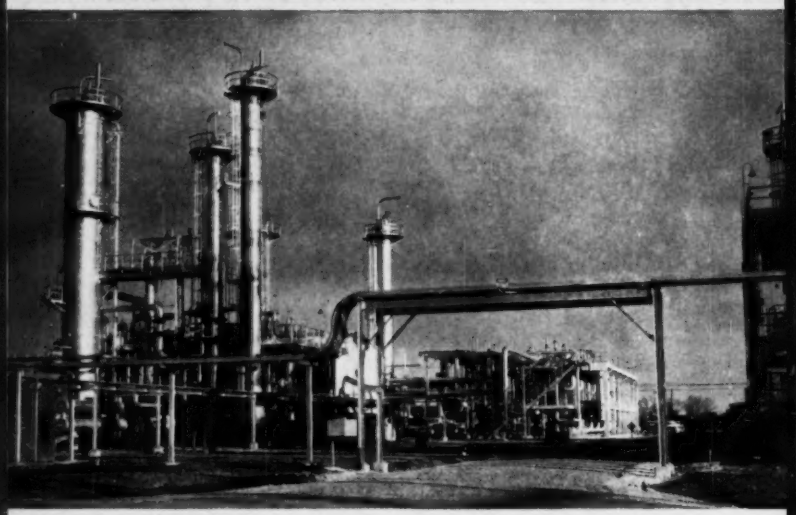

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